Buying—COAL AGE—*Section*

COAL AGE

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Getting Your Money's Worth

Are your children going to be proud of you, or are they going to feel ashamed because you are a failure?

MOST MEN fail to get their money's worth in the average everyday happenings of life. There are two principal reasons: First, poor judgment in making purchases; second, improper and incomplete utilization of the things bought.

The improper use of what we purchase is as bad as its incomplete use. Something abused is little better than something unused. The degree of a man's material success during a year is in proportion to what he has saved, not what he has spent; what he has done, not what he has talked about, thought about and dreamed about. Dreams are beautiful—sometimes—but you can't cash one in for even a ham sandwich.

There isn't room on this page to talk of more than one thing, so I'll confine myself, not to poor judgment or good judgment in making investments, but to the correct utilization of what we possess. Being an editor, I know more about papers than about bonds. Any fool can clip the coupon off a bond, but it takes patience, persistence and sense to extract the income return from a weekly journal.

I said I knew more about papers than anything else. I'll go a step further and say I know more about "Coal Age" than about any other paper; so now we're down to brass tacks.

Here are some things I know. "Coal Age" is the only paper in America devoted to mining coal. It is the largest paper in the world, in both circulation and size, dedicated to the fuel industries. Last year it gave its readers about 2,200 pages of editorial information, or more than seven pages for one cent. This was in addition to 1,900 advertising pages, all of which were of great interest and real technical value.

The average total cost of one editorial or reading page in "Coal Age" is $20, so that the subscriber is offered about $140 worth of information for one cent. Those who are securing all or even half this return need read no further. Likewise, men who attribute success to luck are wasting their time scanning this. But those who claim to be too busy to study and keep informed are urged to read on. It's the men who are doing things we want to reach, with the idea of helping them do bigger things.

Two heads are better than one. One hundred heads are better than two. Upward of 500 coal-mining men expressed their opinions and described their experiences in "Coal Age" last year. No person traveling 24 hours a day for 365 days could have visited the mines described and investigated the methods and devices treated in this paper by these writers. And yet there are those who are so deep in a rut that each of their elbows touches a horizon, and the only way they can see light is to lie flat on their back and look straight up to heaven.

The 6,000 American coal mines need 6,000 superintendents, besides other officials of both a higher and lower rank. The men who attain to these positions of authority and responsibility get there through knowing more about mining coal than the 900,000 other men who are engaged in the industry but work with their hands instead of their head. Sometimes luck will advance a man, but only ability will keep him in the forefront.

Here are some definite suggestions: Set aside two hours each week to read "Coal Age." There are 168 hours available, so two of them can easily be spared for self-advancement. That's only giving $1\frac{1}{4}$ per cent. of your time to increasing your knowledge of mining. Any man with good health, good habits and a fair amount of common sense who will follow this plan a year will have absorbed a sufficient amount of real scientific knowledge about coal mining to insure him the respect of his associates, the esteem of his superiors and the lasting gratitude of his family, who cannot rise above the social level created for them by the head of the house.

Are you doing the best you can? Soon it will be too late to be sorry.

Accidents from Carelessness

[This is the third installment of articles describing actual instances where the results of carelessness have been serious and in many cases fatal. A knowledge of the mistakes of others is one good way to avoid a repetition of these dire mishaps. At least two more installments of these articles will be printed.—Editor.]

Do It Now

By J. B. DeHart

Not very long ago, an experienced miner was working in the pillars of a certain mine. The seam pitched at approximately 30 deg. and the rooms were driven about 10 ft. wide straight up the pitch, leaving pillars about 50 ft. square. In places "rolls" were encountered in the roof and the seam thinned out for a few feet.

This particular miner was working in the pillars about 10 crosscuts or 600 ft. above the main entry. Three or four pillars had been extracted, and the roof was standing on props. The pillar in which he was then working was nearly out, and the fireboss told him to put up a battery of props in the room just below to hold the rock in case the place should cave. Being an experienced miner and one who thought he knew better than the boss, he did not do this and that night the place caved.

Fortunately there was a roll in the roof just below the pillar where the seam thinned out to about three feet and a large piece of rock jammed there between the floor and the roof. This was all that prevented the rock from sweeping down the room, clearing all the timber before it, caving the room and blocking the main entry 600 ft. below. It was also all that prevented this man from losing his job.

Now the moral of this true story is not that orders can be disobeyed with impunity. Do *YOU* want to take the chance that this man took? Have not *YOU* a wife and family, just as this man had, to whom you owe it to take all reasonable precautions to hold your job and prevent accidents? No, the moral is this: "Do what the boss tells you and *DO IT NOW.*"

The Danger of Crossing Trips

By T. A. Mitchell

At the mine where I am employed, electric locomotives are used to haul the cars. The brakeman is required to throw a switch behind each trip on leaving his section of the mine en route to the tipple. He is also required to uncouple, in order to save the time required to walk the length of the trip.

Dan, a colored workman, used to cross over to the head end of the trip while the cars were in motion. He had been cautioned of the danger of this practice, but had replied that he was too quick to get caught. On Mar. 2, 1916, however, he was jerked off the third car from the locomotive and crushed beneath the cars.

On Apr. 10, 1916, Jim, another colored workman, was jerked off the rear end of the locomotive and crushed. He also had been warned of the danger of crossing the trips while the cars were running, but answered that he had been doing this same thing for a long time and could not be jerked off.

It cost the life of these two men to prove to the rest of the brakemen employed at this plant that crossing trips while the cars were in motion is a dangerous practice. The company employing these men has safety rules posted up, requiring brakemen to ride the rear end of the last car, where, if jerked off, they would not be injured.

I have been an eyewitness to many accidents caused by the violation of safety rules. In my opinion it is the duty of every mine foreman to discharge any man who refuses to obey safety rules, as he not only endangers his own life, but also that of others. It would be better for an employer to lose the services of an employee who insists on taking a chance than to have him continue his service and meet with disaster, making his employer as well as his own family suffer the penalty of his carelessness. Possibly the loss of a few jobs to such a man would cause him to be more careful and obey safety rules. At any rate there would be fewer accidents and fewer lawsuits.

Lost Eyesight Through Striking an Unexploded Cap

By George Stockdale

I remember an accident that happened some time ago in a mine where I was working. The coal was blasted from the solid by a man employed for that purpose after all the miners had left the underground workings except the shotfirer. All shots were fired by an electric battery. The shotfirer failed to fence off or report a place where the hole had missed fire.

The fireboss, on making his examination the next morning, found that the ends of the fuse wire were twisted where they had been connected to the cable and took it for granted that the place was safe. He sent the miner in to work, and at 10 o'clock, when the man was loading his third car, he struck the unexploded cap with his pick, setting it off and causing an explosion that destroyed his eyesight, besides disfiguring his hands and face.

This man paid the price of someone else's carelessness.

In this same mine two men were given the contract to cut through a fault composed of a hard sand rock. There was a shelter hole in the place 70 ft. back from the face, and they had a cable 100 ft. long. The man that did the shooting on this particular day stood with half his body out of the shelter hole and fired the shot. A piece of rock flew and hit him on the head, fracturing his skull. He died before he got to the hospital.

Returned Too Soon After Shooting

By W. H. Noone

One night a few months ago the families of two miners became alarmed over their not coming home at the usual hour. A searching party was formed and, on going into the mine, found the bodies of the men at the face of their working place under a piece of rock weighing several tons; the two miners had evidently been dead several

hours, and the conditions clearly indicated that the last work done was the firing of a shot.

This accident emphasizes the care and caution that should be exercised by every workman when entering a working place immediately after shooting. The West Virginia Mining Law reads that a miner shall not enter a place after shooting till the smoke has cleared away and shall make a careful examination of the condition of the roof before starting to work. It is reasonable to assume that the shot released coal hitherto supporting the roof—none too sound—and when these unfortunate men entered, very likely eager to ascertain what their shot had done, the rock came down and entrapped them.

Paying Price of Carelessness

By Edward H. Coxe*

Several years ago, before as much attention was paid to checking men in and out of the mines as is done now, I was called on the phone about 9 p.m. and notified that one of our miners had failed to show up at home. He was a single man and often did not go directly to his boarding house, so that in this instance his failure to arrive did not occasion any alarm till long after supper time.

I immediately went to the mine, organized a searching party to go look for the missing man and phoned for the doctor to be on hand. The man was found dead in his room in the mine, partly covered with coal, having gone back on a missed shot, fired with a squib. The doctor pronounced that the man had been instantly killed. Although there was absolutely no liability on the part of the company in that case, the liability insurance company made a prompt settlement with the family of the deceased on account of the possible effect on the jury of being told how the man lay there in the dark for several hours before being found.

This happened at a union mine, and this occurrence made it easy to arrange with the pit committee for the adoption and carrying out of a checking system to keep track of all who were in the mine at any time. This checking system was the means shortly thereafter of saving the lives of two negro miners who, after shooting, had gone back to see what their shots had done before leaving the mine, and not having waited long enough for the smoke to be carried out, were overcome. As soon as the other men had gone out, the checkboard revealed the presence of two men still in the mine; and by consulting the mine record it was ascertained who they were and where they worked, and some men were sent back with a car to find them, which was quickly done. They were soon resuscitated, and in a couple of days were no worse off for their experience.

Another instance in the same mine of a man going back on a missed shot resulted in his spending a few months in a hospital recovering from a fractured skull.

In a slope mine where it was against the rules to ride loaded cars on the slope, the night foreman after belling up the last rock trip for the shift, blew out his light and jumped on the middle of the trip to ride out, rather than walk. A couple of his men followed his example, the trip broke loose before it reached the top, and as they had failed to attach the drag, furnished for the purpose to the rear of the trip, it ran back to the bottom and killed all three of them.

In the same mine, where there was a good manway to the top, a miner finished his work early and started to walk out of the main haulage slope. There was a sign at the bottom prohibiting walking the main slope, and the chainer at the bottom also told him to walk out the manway and even fastened a trapdor there. He forced the door open and walked the slope anyway. Result—an empty trip coming in hit him, and he was unable to work for about a year.

Tampered with Spring-Latch Switch

In another slope mine a night man was bringing out rock and old timbers and taking in props. He brought out a trip of rock with one car of old timbers. He switched out the car of old timber and left it standing on the empty track. Then he propped shut with a tie the spring safety switch placed on the empty track to keep loose cars from running down the slope, and rode a trip of props down the mine. The car of old timbers rolled down the slope after him, evidently not having been sufficiently well spragged or blocked, if at all, and he was killed trying to save himself a little trouble by rank carelessness and infraction of rules and making ineffective a safety appliance.

A case where a foreman was to blame for an accident by not enforcing discipline was at a mine where the men were hauled in to work from the slope bottom in a double-header motor trip, the grade being steep at the beginning. The men were supposed not to get into the trip till both motors were coupled on and the trip all ready to start, but it seemed that this rule was not enforced and the men crowded into the trip while it was being backed into position and before the second motor was coupled on.

On this particular morning the sanding apparatus on the one motor that was coupled on was out of order; and before the second motor was attached, but with a goodly number of men aboard, the trip started down the grade, and on account of lack of sand the motorman could not hold it. One man was killed and one or two badly hurt. The foreman made the excuse that he could not keep the men off the trip till it was ready without losing time getting the run started, but he did after that, and didn't lose much time either. This foreman was at fault for not enforcing discipline in regard to the men boarding the trip and also for allowing a motor to operate, especially on such a steep grade, with defective sanding apparatus.

Another instance was of a man walking along in a mine carrying in his hand a detonating cap he had borrowed from one of his neighbors. Evidently a spark from the lamp on his head dropped in the cap, for it exploded, causing the loss of two of his fingers.

Another case was that of a gas-man who put an open light down on the ground at the mouth of a crosscut that was being driven and then took off his coat and with it brushed some gas out of a pothole right down on his lamp, burning himself badly and blowing open a door on another heading, which failed to close of itself on account of catching on a piece of coal or slate on the track, probably blown there by the explosion. This gas-man brought suit against the company for his burns on the ground that the door being open caused insufficient ventilation.

*Consulting engineer, Knoxville, Tenn.

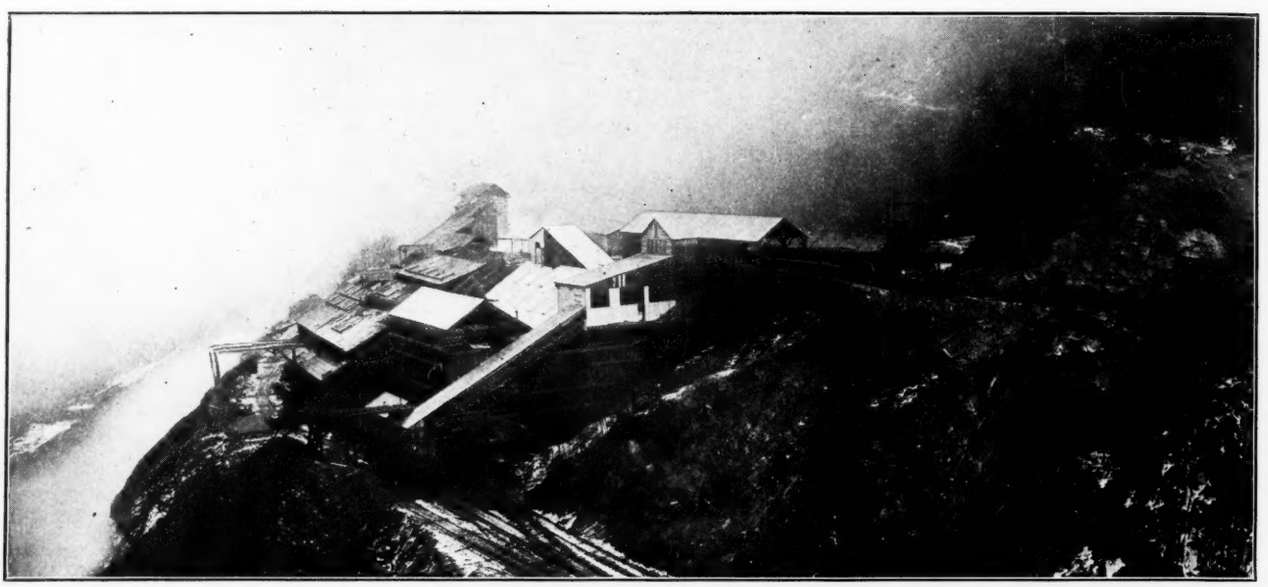

FIG. 1. CARBON RIVER CANYON, SHOWING TIPPLE COMPLETED AND WASHERY UNDER CONSTRUCTION

Working a Steep Coal Seam by the Longwall Method

By S. H. Ash*

SYNOPSIS—The substitution of a modified longwall method of working for the previously used room-and-pillar and chute-and-pillar methods resulted in many advantages. By this means a losing proposition was transformed into a paying one.

The following method of working steep seams by longwall is being practiced at two of the mines of the Carbon Hill Coal Co., at Carbonado, Pierce County, Wash. The Carbonado mines are reached by rail on the Northern Pacific Ry., 53 mi. distant from Seattle, Wash. The mines at Carbonado, because of folding and faulting, the topographic and physical conditions of the seams and walls, present many interesting and complex features of operation. All angles of dipping are found in the field, and the methods of working the seams vary accordingly.

At present six seams are being worked, two of which, No. 9 and the Miller, have been changed to a modified longwall method of working in preference to the breast-and-pillar and chute-and-pillar methods practiced in the other seams. All the Carbonado mines have been opened as water levels starting above high water level in the Carbon River Cañon. This cañon in places has a width of from 50 to 80 ft. and is about 400 ft. deep near the mines. The river has cut through the sedimentaries and exposed the seams.

The tops of the seams have been eroded and the outcrops are usually covered with a varying thickness of gravel. Owing to the available coal above water level, only two of the seams—the Miller and the Wingate—are being worked below water level. A slope has been sunk on the Wingate seam to the 6th level.

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The Carbonado mines have been the largest producers in Pierce County, and their total output has reached nearly 7,000,000 tons. About 1,000 tons per day is being produced. The output of coal at the mines in 1915, in spite of the dull year, was 199,469 short tons, that of the state being only 2,407,066 short tons.

The product of the mines is a bituminous coal ranking with the best in the state. From 15 to 20 per cent. of the coal is made into coke, the production of which, during the present year, was 19,178 short tons. The coke is made at the mines, and the remainder of the coal finds its market in and about the Puget Sound cities and in steamer trade.

I have had occasion to note the successful application of the longwall method as applied to the Miller seam during the last two years, and for this reason the operation of this seam will be discussed. Several attempts were made to work this bed by breast-and-pillar and chute-and-pillar, but with poor success, owing to the bad roof which could not be kept up.

The present company has been under the management of J. F. Menzies since Nov. 1, 1913, and much credit is due him for his consistent efforts to modernize, increase the efficiency of and render safe the company's collieries.

The coal of the Miller bed is from 4 to 4½ ft. thick between walls, a detailed section of which is shown in Fig. 2. The coal is used as a domestic and steam fuel. The seam is reached by a rock tunnel 600 ft. long from the Wingate slope on the second level, as shown on the map. Because of the impossibility of profitably working the seam by breasts or chutes, little has been done on the seam compared to that done on the other beds, and the second level is now being worked. The dip of the seam decreases south from the main rock tunnel, the coal at the present face having a dip of about 38 deg.

The level now being worked was originally opened up for chutes and pillars, and present practice is consequently not the same as it will be in future developments. The gangway, which is the intake airway, is driven in the coal and is timbered by three-piece sets consisting of 8-ft. collars and 9-ft. legs with lagging between sets.

A counter gangway, 4x4 ft., is driven parallel to the main gangway, about 25 ft. up the pitch from it, through which the air travels from the gangway to the longwall face. The air then circulates up the longwall face to the old gangway above. It was found practically impossible to keep this gangway open as a return airway.

In order to have a good permanent airway it was found more economical to drive a rock tunnel in the footwall parallel to the top gangway and about 20 ft. from it, as shown in Fig. 5. This tunnel is 7x6 ft. and was driven for $19 per yard. Crosscuts are driven 4x4 ft. from the tunnel to the top gangway at intervals no greater than 50 ft. to tap the longwall face, their distance apart depending on the condition of the face.

This tunnel is the return airway for the longwall face, and timber is brought in through it and taken down the longwall face by timber packers, as required. The first cost of driving the top tunnel is slightly higher than when driving in the coal, but when the cost of retimbering, general upkeep and the value of a reliable and permanent airway and escapeway is considered, the tunnel is the cheapest in the end. Chutes connecting the gangway and counter are driven up the pitch 25 ft. apart, as shown in Fig. 5.

Method of Opening a Face

The method of opening up the longwall face, as shown in Fig. 3, was as follows: The first two chutes are driven narrow up the pitch from the gangway, with a 12-ft. pillar intervening. The crosscuts above the counter are driven about 4x4 ft. with a block of 50 ft. between them. As soon as the chutes are up one block, the longwall face is begun, there being room for one miner, who starts in chute 2 and drives angle *a* to meet angle *b*, which is driven by the counter miner, who drives it before he proceeds with the counter gangway. Skip *a* is then continued about 6 ft. wide on up the pitch, its faces (*a*2, *a*3, *a*4, *a*5) being at all times about 18 ft. behind the face of chute 2. When skip *a* is up about 18 ft. from the point of the angle, skip *b* is started and continued on up the pitch. This is repeated

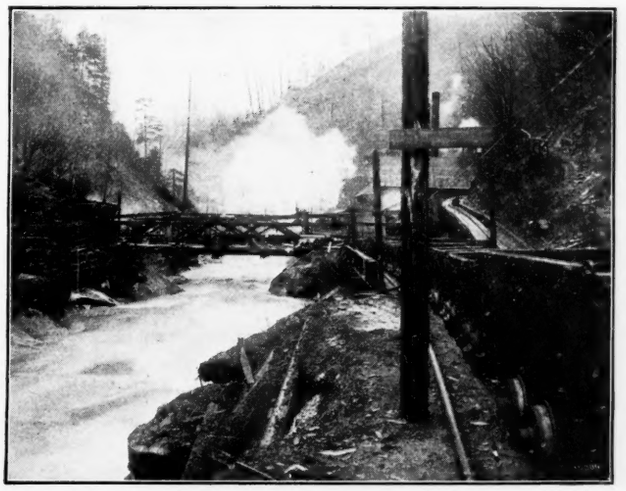

FIG. 4. DUMP BRIDGE OVER CARBON RIVER

on the skips following. When skip *a* has reached the point shown at *a*5 the face will be as shown by the heavy line *a*5, *b*4, *c*3, *d*2, *e*1. A miner will then proceed to drive an angle from chute 3, as shown, to tap angle chute 4, and the longwall face will proceed inby.

Before chutes 1 and 2 tap the old gangway and the rock crosscut is driven from the rock tunnel at top of chute 1, the air will travel up the last crosscut from the gangway to the counter, back along the counter to the longwall face, up the longwall face and then down chute 1 to the counter, through which it will return to the main airway and to the fan. The usual practice in this field when the gangways are driven as water levels, or have a gangway above to be used as an aircourse, is to drive but one rock tunnel connecting the seams and then drive a chute or pair of chutes through to the surface or to the gangway above for a permanent airway. Until this is done a brattice, sollar or airbox is carried in the rock tunnel, making two compartments for the purpose of ventilating.

Outside the longwall face in chute 2 no attempt is made to keep this chute open after angle chute 3 is tapped by the longwall face. The chutes 1 and 2 are driven with a small pillar between them in order that they may be rushed, and there is little possibility of profitably recovering the pillar separating them.

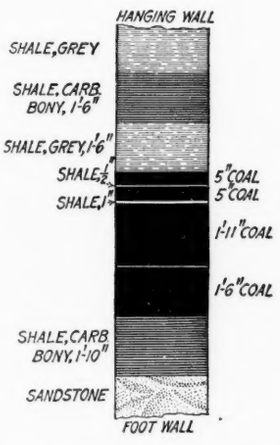

FIG. 2. SECTION OF THE MILLER BED

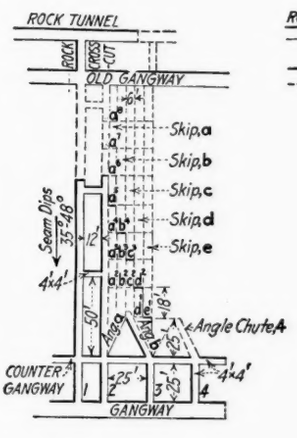

FIG. 3. METHOD OF OPENING A FACE

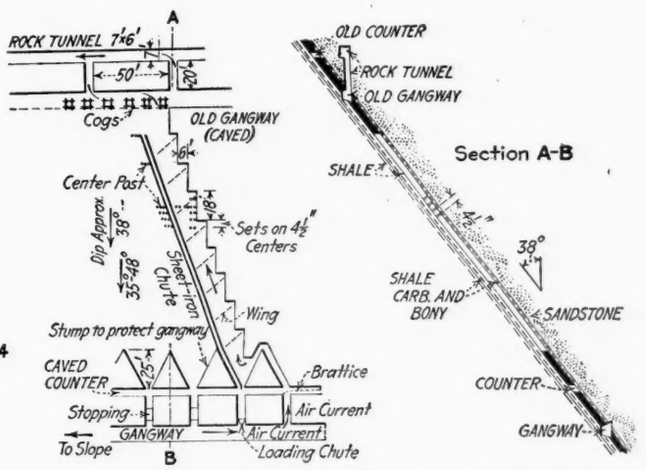

FIG. 5. PLAN AND SECTION OF THE MINE WORKINGS

Fig. 5 shows the longwall face developed. The miners take a 6-ft. skip each, keeping about 18 ft. apart driving through to the top level. As soon as a skip is finished the miner drops back to the bottom of the longwall face and starts another 6-ft. skip. The present longwall face is about 500 ft. long. Thirty miners work upon it. The output is about 250 tons per shift of 8 hr. The longwall

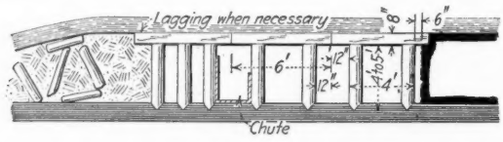

FIG. 6. METHOD OF TIMBERING AT THE FACE

face, counter and chutes work but one shift, while the gangway is double-shifted.

A sheet-iron chute is used to carry the coal from the men to the gangway. This is kept full, and batteries are placed at intervals where necessary to keep the coal from rushing. Four buckers are employed to keep the chute in shape and run the coal. This chute is moved to the longwall face once each week when the longwall face is not working.

The longwall face advances inby from 18 to 24 ft. each week, so that the chute is never ordinarily more than 24 ft. from the face. When the chute is moved to the longwall face, a center post is set under each stringer of the sets outby and next to the chute. This strengthens this set and protects the chute. The sets outby and next to the strengthened sets are knocked out, and this takes the weight off the faces and allows the roof to sag and cave behind, as shown in Fig. 6.

A wing is kept below each miner to prevent anything from falling on the man below, and also serves to carry the coal into the chute. Owing to the broken ground near the old gangway at the top of the longwall face, cogs are built for the purpose of keeping the top open so that timber can be brought down from above and insure an open place until the next crosscut is open from the rock tunnel.

Method of Timbering on the Pitch

In Fig. 6 are shown the typical timber sets used on the pitch and the lowering of the roof behind the longwall face. These sets are composed of two 4- to 5-ft. legs, usually set in hitches in the footwall, and a 6-ft. stringer, all of about 8-in. timber. As a rule lagging is used above the stringers. Each miner puts in an average of two sets during each 8-hr. shift, for which he is paid at the rate of $2.30 per set. The sets are placed on 4½-ft. centers on the pitch and the stringers are set end to end, so that in the event of a squeeze a cap piece can be put under the joint and a post set under this, thereby strengthening the joint materially.

As the face advances before a set, the roof is kept up by means of lagging and temporary posts. As soon as sufficient distance is made for a set, a hitch is cut into the rib about 6 in. in depth and the end of a stringer placed in it. A post is then set about 1 ft. from the other end, the other post is set about 6 in. from the rib and the temporary posts knocked out. The lagging above the sets can be reinforced if necessary. The timber on the pitch is brought by timber packers on the opposite shift to that in which the miners work to each skip face of the longwall by way of the rock tunnel above.

There is a good current of air traveling at the face at all times. The mine is on open lights and the miners blast the coal whenever they think it is necessary. As there are always two free faces, only small shots are fired. When powder is employed it is No. 5 coal, giant permissible powder, which is detonated by No. 7 caps using fuse. The miners buy their own blasting supplies at the following rates: No. 5 coal powder at 19c. per lb., fuse, at 60c. per 100 ft., and No. 7 caps, at 2c. per cap.

Electric haulage is used on the gangway. The coal is here loaded from the chutes into 15-car trips, the capacity of each car being about 72 cu.ft. When loaded the cars weigh about 2 tons each. These are taken to the bottom of the slope and hoisted to the surface in four-car trips.

The labor employed at the mines is all union. The scale of wages is regulated by an agreement between the company and the United Mine Workers of America. The wages paid throughout the state are the highest in the United States. In the majority of instances the labor is by contract, and the average wages are above the scale rate for day work. The minimum wage underground is $3.15 per shift of 8 hr. The miners on day work receive $3.80 per shift of 8 hr. and are furnished with all tools and blasting supplies.

It has been proved that by longwall methods a larger tonnage per man can be maintained and that the coal breaks better, producing a larger percentage of lump. It is

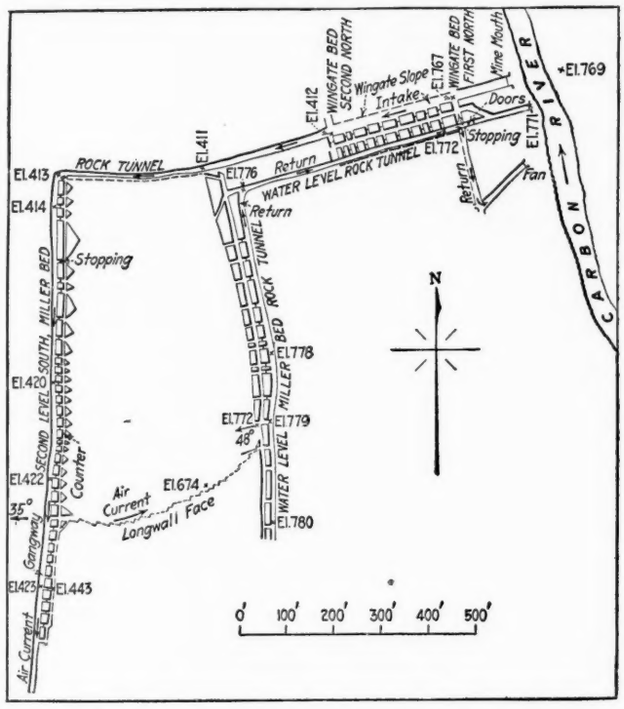

FIG. 7. GENERAL PLAN OF THE MINE

stated, however, that by longwall the cost per ton of coal is slightly higher than by breast and pillar or chute and pillar. This is not true at this mine. Of the other systems tried the coal was not mined at a profit, while with longwall the cost was reduced to the point where profit is made.

This is due to several causes. What was formerly a safety-lamp mine is now an open-light mine. There is a good current of air at all times sweeping the working places and this can be better regulated than under the breast-and-pillar systems, and the ventilation is ascen-

sional. There are no places on the pitch other than one face to be kept open. There is no upkeep on the return airway now driven in rock. Although a large amount of timber is required, it is no greater than was formerly necessary. Moreover, under the old system the places could not be kept in shape. The timber can be taken more quickly to the working places. Less powder is used and a larger percentage of lump coal is obtained. The work is all concentrated, and the longwall face permits of a more frequent and closer inspection of the working places by the mine officials. The coal is practically all recovered.

The system here described has proved to be a success and it is planned to extend it to other levels and develop the seam on the present lift north of the main rock tunnel. However, the gangways are to be driven in the footwall rock and rock chutes driven to the seam. The first cost of gangway will be higher, but will soon be overcome, for all the coal will be extracted above this passage; the gangway will serve as a permanent airway for the level below and will require but small upkeep, no retimbering will be necessary; no timber is required when driving is done in the footwall rock and the tracks will always be in good shape. It is difficult to keep a track in shape in a pitching seam when the walls are inclined to heave and break and the track bed is partly on the seam.

A new preparation plant is nearly completed. A new slope is being started for the purpose of making one large mine and concentrating what are now several small ones. General improvements are under way for preparing and handling the coal, all of which when completed will make a safer and more profitable mine.

Opportunity in Disguise

By George A. Reifsnyder*

SYNOPSIS—Opportunity frequently moves quietly and incognito. Those who can perceive her presence, penetrate her disguise and lift her veil she rewards lavishly. The only important constituent of luck is the second letter.

It may be true that Opportunity knocks but once. Yes, it may be so; but I am inclined to think that this statement is a gross slander. The great difficulty with those who bewail their fate in this world is that they are unable to recognize Opportunity when she comes.

The following incident proves that Opportunity really comes in disguise, and the successful men are those who are able to lift the veil. Then it is that she reveals herself in all her glory as a reward for their skill, which resolves itself into the simple factor of doing each day's work, as it comes, to the best of their ability.

If it will add anything to conviction to say that the following story is true, then so be it; for it is absolutely so, except the names of persons and places, which are necessarily fictitious.

Dave Jackson was one of a half-dozen clerks in the weigh office at the mines of the Marengo Coal Mining Co., up in the mountains of central Pennsylvania. He had been in that office for about 12 years, and it did not seem that his prospects extended much beyond some day being the weighmaster, provided two or three of the other fellows ahead of him died first.

One day the following message was received from the main office of the company in Harrisburg, about 150 miles away: "Can use a clerk here at $65. If you have a man who wants it, let him come at once. J. G. Dawson."

About the only men who would fit the job from point of increase in salary were Jackson at $55 per month and Jake Ledyard next below him at $45.

Taking Jackson aside, Otis, the weighmaster, put the proposition before him, showing the lack of prospects in the weigh office and the chances in the head office. Jackson was undecided, so Otis gave him until morning to make up his mind. He finally decided to go, but with no show of enthusiasm.

He lasted only a week, and back he came to the weigh office. He said very little, but Otis learned that while the work he had been put to in the head office called for no particular talent, Jackson lost his nerve and asked to be sent back.

"Want it, Ledyard?" asked Otis.

Want it? After having been in that office for 8 years with nothing to do but watch the loaded coal cars go by on the scale and jot down their weights, and with the prospects that it would go on for another 8 or 10 years, with him now 35 years old and making $45 per month? Sure he wanted it.

In two days he was on the new job. His work was similar to that which 10 or 12 other men in the office were doing. It was simply making out the bills for the coal that was shipped to the customers of the company. Of course the converting of tons and hundredweights into dollars and cents required care, but after the first week or so it became to Ledyard as monotonous as weighing the same cars had been.

But this work was a tonic after the long drill in the scale house. He fairly ate work and offered to help out the other clerks, which tender was accepted without much reluctance. Yet they inwardly smiled and felt that the enthusiasm would soon wear off.

A Purpose Is Born

But Ledyard knew what he was doing. It was more than enthusiasm; it was purpose. He kept himself busy every minute of the day, always trying to do just a little more than he thought was expected of him. He also acquired the habit of appearing at the office in the morning from 15 minutes to a half-hour earlier than the appointed time, and then at night he always found he could do something to the interest of the company even though it took him until after quitting time. These voluntarily lengthened hours, to be sure, were no hardship to him, for he had worked even longer shifts in the coal region.

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The other fellows in the office kept smiling at him and thinking, "What's the use."

But they were due to learn something, and even greater yet was the surprise to Ledyard himself. He was appointed to a new job when he had been in the office only a month! And that too over the heads of them all. A man had resigned to go with another concern, and when the powers that be analyzed the situation, the only man who really knew anything about the job was Ledyard. As a matter of fact it began to dawn on them that inside of a month or so Ledyard had learned considerable about all the jobs in the office and would soon be able to hold any of them.

For a few days there was murmuring in the office, but the clerks finally realized why they were passed by, and then lapsed back into their old habits. As for Ledyard, he was such a good fellow that he soon regained their good will and continued on at his new work without acquiring a swelled head.

Promotions began to have a habit of seeking him out, and in the course of a few years he found himself as chief clerk. Nor did his zeal end there. In his new position he got around to most of the other offices, and the officials began to notice him as a man who was actually working zealously for the company in an effort to give real value for the money which they expended on him as salary.

Next it was but a natural jump from the auditing office to that of assistant sales agent. And today, 10 years from the time he was making $45 per month at 35 years of age, he is the sales manager of one of the biggest coal companies in the field, with an office in Philadelphia and a salary of $12,000 a year.

How Did It All Come About?

If you were to ask Ledyard how it was done, he would probably be unable to tell. All his life it has seemed natural to him to be as honest with other people's time as he should be with their other valuable property. Yet with it all Ledyard feels that he is nothing out of the ordinary.

Now what was the difference between Jackson, the man who first had the opportunity, and Ledyard? Jackson was a good man as men go, and if anything he had more education than Ledyard, being a high-school graduate, while Ledyard had but the ordinary grammar-school training.

These two men had the same opportunity, as did everyone else whom Ledyard passed on the way. Yes, they all had the same opportunity, but only one recognized it. The trouble seems to be that since Opportunity is reported as knocking, most men expect her to make even more noise and announce herself with a veritable blare of trumpets.

In Ledyard's case she came unannounced, on tiptoe, with face hidden until he unmasked her. Yet despite his example there are several dozen men in the same company today doing practically the same work they were performing when Ledyard came among them and still bewailing their places in life. Occasionally they point at Ledyard and say what a lucky fellow he was anyway, yet still failing to see opportunity. They forget that the only thing of importance in luck after all is the second letter of the word. And this, according to English orthography, is spelled *you*.

Replacing Locomotive Tires

The steel tires on a 13-ton locomotive at the mine where I was employed became worn out. It was an outside-wheel locomotive and was used in a shaft mine. The shaft was 274 ft. deep and the locomotive house was about 100 ft. from the shaft bottom.

A new set of tires was procured, and the following method was employed in putting them in place. Starting on Saturday afternoon at 4 o'clock the locomotive was jacked up so that the flanges of the wheels were about ? in. above the rails. Two men then hacksawed about a quarter of the way through the old tires. As soon as they finished sawing they were able to crack the tires entirely through with wedges. The broken tires then came off readily. They were 4 hours doing this work.

Next morning, not having any fire around the plant, the four new tires were placed in a boiler furnace and heated to a cherry red. Hooks had been made beforehand to carry the tires over to the shaft. As soon as the tires were heated sufficiently they were taken one at a time to the cage. After being lowered to the shaft bottom they were carried to the locomotive and put in place. There was no hitch at all in the work, and the new tires were on the locomotive 5 hours after the job was started.

If a locomotive can be run outside the mine, tire replacement is a comparatively easy operation, as a fire can usually be built near the machine and the heating done close at hand. It is not necessary to heat tires to a red heat unless they must be transported a considerable distance.

With an inside-wheel locomotive, tire replacement is a much longer operation, as the locomotive frame must be jacked up so as to permit withdrawing the wheels from under the machine. It is usual in mining practice to have a spare set of wheels on hand. Where this is done it is a good plan to have these wheels ready to put under the locomotive at any time. To this end, the gears should be fastened in place and the entire set should be kept oiled or painted and in complete readiness for the time when it will be needed.

Electricity at the Face

In Great Britain the miners in many instances take a serious view of the use of electricity at the coal face. In a recent report, John Wadsworth, M. P., of the Yorkshire Miners' Association, directs attention to the statement at one of the meetings of the Association of Mining Electrical Engineers that in the electrical coal cutter we have a direct application of that power, and certainly with economical results; but the limited dimensions within which motors and controllers have to be constructed, especially those for use in thin beds, tend to render them liable to breakdown.

Mr. Wadsworth then says: "I contend that no electricity should be taken to the coal face in any coal mine where accumulations of gas are present or where outbursts of gas are liable to occur from time to time, because it is quite certain that, with the first defect to be found either in the machinery used or in any other direction, we shall have a serious explosion, and in all probability, if it is a large mine, many lives lost through the use of this mode of coal cutting. I am still opposed to it and cannot see how it can be used, under circumstances such as I have outlined, with any degree of safety."

Lackawanna Washhouses

By C. M. Young*

SYNOPSIS—It has been demonstrated that miners use the bathhouses when these are made attractive. The bathhouse at the Loomis colliery is the newest and one of the best equipped in the anthracite region. Water is heated by exhaust steam to a maximum temperature of 180° F., so there is no danger of scalding. The clothes hangers are of special design and are practically ordinary coat hangers with certain additions.

The coal department of the Delaware, Lackawanna & Western R.R. has been building a few new washhouses and putting in better equipment at some of the old ones. The improvement of conditions has one interesting result; it has been found that the use of the bathhouses increases with the improvements.

In some cases local officials were asked to estimate the amount of equipment required, such as lockers and showers, and, basing their estimates on the use made of the houses under former conditions, asked for less than the men would be glad to use. In other words, the men will use the changehouse or bathhouse when it is really inviting. If a man, coming out of the mine, can have a good bath and put his mine clothes where they will dry and be well aired out, he is glad to do it. This is leading to the installation of increased equipment.

The newer washhouses are attractive buildings, but a more important consideration is that they are well fitted or use. Two points deserve special mention—the arrangements for heating water and those for drying clothes. The Loomis washhouse has 10 showers, that at Bliss has 18 and those at other colleries have varying numbers, depending largely on the judgment of the local officials as to the number that would be used. Showers are provided with hot and cold water. In each case water is heated in Patterson heaters by exhaust steam. The company has installed 14 of these heaters and has had no trouble with them.

The heater consists of a tank in which the water is heated by exhaust steam, with a means for controlling the steam and water. At Loomis the capacity of the tank is 3,000 gal. per hr. Exhaust steam is used at a pressure of 4 to 5 lb. Provision is also made for the use of live steam in case the exhaust should for any reason be deficient. At present about 250 to 300 men bathe every day, but more would do so if they had the opportunity, and the company is now planning to double the capacity of the washhouse. This will involve the installation of a second heater.

Water Temperature Is Limited

One of the best things about this heating apparatus is the arrangement in the later models for limiting the temperature attained by the water. The temperature to be reached can be regulated as desired, and in this case it is set for 180° F. When the water in the tank reaches this temperature the steam is automatically shut off. The object is not to save steam but to prevent any possibility of scalding by overheated water in case some bather should make a mistake and use hot water only.

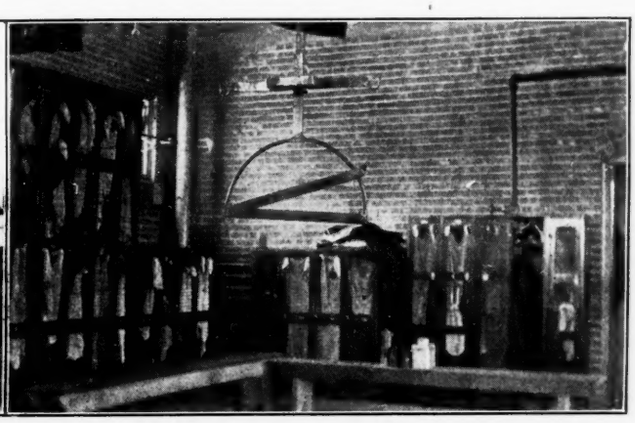
Water heated to 180° would certainly be uncomfortable, but it would not do any real damage in the short time which a bather would spend under the shower. The valves controlling the supply at each shower are plainly marked "Hot" and "Cold," so that there is little danger of an uncomfortable bath.

The showers have brass mixing chambers, fitted with a number of small brass nipples. These offer maximum resistance to corrosion, will not become clogged by rust and will maintain the diameter of the opening for a long time.

The same results, so far as use of equipment is concerned, have been obtained at other collieries.

The arrangements for hanging clothes are especially good at Loomis. A style of hanger is used which was designed at the colliery and which is different from any other. It is home-made, from light, flat and round iron. Beginning at the top, a vertical piece extends from the hook, by which the hanger is attached to the suspending chain, to the upper part of the curved piece, as shown in the accompanying illustration. Across the upper part of this vertical piece is a horizontal piece, having a hook at each end and a soap dish in the middle. Opposite the soap dish, in the middle of this horizontal piece, is a third hook.

EXTERIOR VIEW OF THE WASH HOUSE



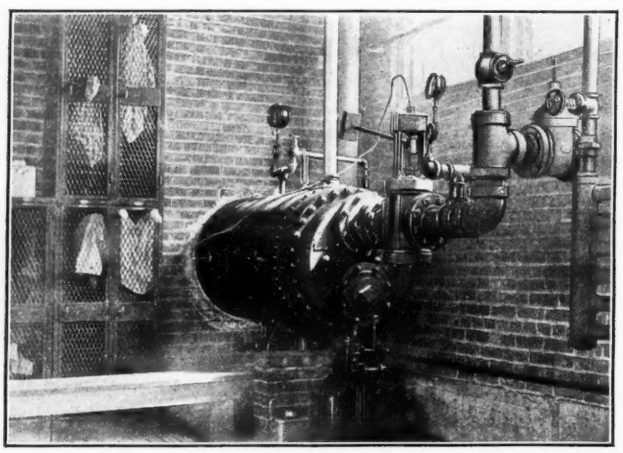
LOCKER ROOM, SHOWING SPECIAL CLOTHES HANGER

*Scranton, Penn.

These hooks are used to support shoes and anything else desired. Underwear and trousers go across the lower horizontal bar and are held in place by the hinged bar. Coats or overcoats, or both, go across the curved part. It is, in brief, a rugged clothes hanger, with some additions. The hangers are supported on brass chains, which are secured by padlocks.

Instead of being arranged along the sides of the room, as is common, these hangers are supported on an iron frame which occupies the whole center of the ceiling. This is made up of parallel bars running lengthwise of the building. Each bar holds the pulleys for 12 chains, and as there are 12 bars, the capacity of the present frame is therefore 144 hangers, 72 of which are operated from each side.

Special reference has been made to the Loomis washhouse, because this is the newest and is situated at a new



THE PATTERSON HEATER IN THE WASHHOUSE

colliery. It is located close to the shafts, so that the men reach it without effort. This equipment experience has shown to be the most satisfactory and is used more than any other. This washhouse is therefore to be considered a pattern on which others will be modeled.

Walling In Mine Fires

Whatever may be the opinion of expert mining men regarding the walling in of mine fires, it seems there are a great many dangers to be encountered, as was shown on Mar. 16, when two miners lost their lives from suffocation in the Whip-Poor-Will colliery of the Red Ash Coal Co., situated on the mountainside above Wilkes-Barre.

One of these men, William Cincavage, left a wife and 10 children, and the other, George Slitkas, a wife and one child, making a total of 13 new dependents on the company by reason of the compensation act.

These two men, it seems, were at work in a tunnel above the Red Ash vein, in which a fire is burning. This fire is believed to have eaten its way there from the old Kidder workings, which have been burning a long time and which were walled off and abandoned many years ago.

The fire was believed to have been extinguished, but broke out again about four months ago and is being fought at present by a force of 200 men recruited from both the Red Ash Co. and the Lehigh & Wilkes-Barre Coal Co., the latter company's property adjoining that of the Red Ash.

Credence is gradually gaining in the belief that death not only threatens those at work in the Red Ash mines, but also the residents of a section of Georgetown directly over the area affected by the fire. Already six or eight families living in this section have moved their household effects to another place because they have found gas seeping into the cellars. Residents in this section invariably sleep with their windows open at night for fear of suffocation.

One dwelling, a large double block, was completely destroyed by fire in January as a result of this mine fire, and company officials have been reticent concerning the extent of the trouble or the success attained in fighting it. It is generally believed, however, that the progress of the fighters has been very slow, as the occasional appearance on the surface of one of the firemen overcome by the deadly fumes would lead one to believe.

It is commonly credited that the Red Ash Co. is trying to prevent a closing down of its mines. However, the populace are fearful, and it is a recognized fact that should an idle period be compelled at this time it would work havoc with the company and the people of the affected section in and around Georgetown.

The Lehigh & Wilkes-Barre Co. seems to be having its share of mine fires. However, this concern has had considerable success in extinguishing the flames by walling off the affected section, especially the fires in the Buttonwood, Stanton and Empire mines, where the flames were finally extinguished.

Illinois Mining Institute Meet

A meeting of the institute will be held May 25, 26 and 27, 1916, at Duquoin, Ill. Everything will be done to make this meeting a success, and it is urged that not only all members make an effort to be present, but all men in Illinois interested in coal mining are cordially invited to attend. A good program has been arranged.

COMING MEETINGS

American Society of Civil Engineers will hold its annual convention at Pittsburgh, Penn., June 27-30.

Illinois and Wisconsin Retail Coal Dealers Association will hold its next annual convention on July 26 and 27 at Madison, Wis.

Kentucky Mining Institute will hold its annual meeting and first-aid contest at Lexington, Ky., May 12 and 13. Secretary, Ivan P. Tashof, Lexington, Ky.

Byproduct Coke Producers' Association of America, formed in Chicago on Jan. 14 last, will hold its first annual meeting in Boston, Mass., on July 14, lasting probably two or three days.

International Railway Fuel Association will hold its eighth annual convention at the Hotel Sherman, Chicago, Ill., May 15-18. Secretary, J. G. Crawford, fuel engineer, Chicago, Burlington & Quincy R.R., Chicago, Ill.

Illinois Mining Institute will hold a meeting May 25, 26 and 27 at Duquoin, Ill. Secretary, Martin Bolt, Springfield, Ill.

Engineers' Society of Western Pennsylvania. Monthly meeting third Tuesday; section meeting, first Tuesday. Secretary, Elmer K. Hiles, Pittsburgh, Penn.

West Virginia Coal Mining Institute will hold its summer meeting at Bluefield, W. Va., on June 1 and 2. Secretary, E. N. Zern, Morgantown, W. Va.

The Foreign Coal Fields

By A. T. Shurick

SYNOPSIS—The rapid expansion in our export trade has stimulated an unusual interest in the foreign coalfields. American operators are closely studying conditions in the different producing districts of the world with which they may expect to compete. The following article presents a brief compilation of the latest data available on all the important coal-producing countries of the world. The article has been prepared for the 1916 edition of the "Mineral Industry," and this advance publication is made possible through the special courtesy of the publishers.

Australia

The gross coal output for New South Wales for 1914 amounted to 10,390,622 tons, as compared with 10,414,155 tons in 1913. By far the largest proportion of the production originates in what is known as the northern district, which outputted 7,113,991 tons in 1914, the southern district producing 2,362,741 tons and the western 913,890 tons. About 44 per cent., or 4,522,589 tons, of the production is used for home consumption, while 32 per cent., or 3,286,223 tons, is exported to foreign ports, and the remaining 24 per cent. is exported to different Australian ports. The decline in production for the year was probably due to labor disputes in the Maitland district, which was idle from May during the balance of the year.

The production of Victoria for 1914 amounted to 617,536 tons, showing an increase of 23,624 tons over 1913. Most of the coal comes from the state mine at Wonthaggi, the output for the year amounting to 550,107 tons.

Queensland produced 1,053,990 tons in 1914, as compared with 1,037,994 in 1913. The increases occurred in the Ipswich, Darling Douris and Clermont districts. The Ipswich mines are the chief producers, and about one-third of the output was exported and used for bunkering purposes.

In Tasmania only about 60,000 tons of coal was produced last year, practically all of this originating from one or two mines on the east coast.

Austria-Hungary

The Austrian coal production in 1915 amounted to 16,083,074 tons, which compares with 15,411,369 tons for the preceding year. While the output apparently shows a gain of over half a million tons, it is still about 1,700,000 tons less than for a normal year. The lignite production showed a sharp decline from 23,772,069 tons in 1914 to 22,023,811 tons in 1915, while the coke output fell off from 2,189,913 tons in 1914 to 1,907,648 tons for 1915.

The Ostrau-Karwin district continues by far the most important coal producer, outputting 9,572,769 tons in 1915, as compared with 8,917,922 tons for the preceding year. The Kladno district ranks second, with a production of 2,602,100 tons in 1915, as against 2,439,337 tons for the preceding year. Austria ordinarily outputs about 7,500,000 tons of lignite coal for export, though at the same time she imports approximately 15,000,000 tons of bituminous coal, which comes chiefly from Germany.

The production figures for Hungary are unfortunately much delayed, the latest statements available being those for 1913, in which year the coal output amounted to 1,320,000 tons and the lignite to 8,954,000 tons. These figures show a moderate increase over those for the preceding year, which were: Coal, 1,302,405, and lignite, 8,284,871 tons. The Hungarian coal industry has shown a fairly persistent expansion over the past few years, particularly in the output of lignite, which increased approximately one and one-half million tons during the period of 1909 to 1913.

Belgium

According to figures originating from German sources the gross coal production of Belgium for 1915 amounted to 15,925,288 tons. No figures are apparently available for 1914, during the last half of which industrial operations were brought to a standstill through the war operations, but in the preceding year, 1913, the output was 22,858,000 tons. Production during the closing period of 1914 is estimated to have been about one-half normal.

Reviewing the year 1915 by quarters the output shows a persistent increase which would tend to indicate a gradual return to normal conditions. During the first quarter the output of coal was 2,950,237 tons, the second

THE WORLD'S PRODUCTION OF COAL, IN SHORT TONS

Country	1912	1913	1914	1915
United States	534,466,580	569,960,219	513,525,477	517,371,921
Great Britain	291,666,299	321,922,130	297,698,617	283,570,560
Germany	281,979,467	305,714,664	270,594,952	259,159,786
Austria-Hungary	56,954,579	59,647,957	d53,396,400	d52,679,712
France	45,534,448	45,108,544	33,360,885	a20,000,000
Russia	33,775,754	37,188,480	36,414,560	31,158,400
Belgium	25,322,851	25,600,960	a19,000,000	15,691,465
Japan	21,648,902	23,988,292	21,700,572	.....
India	16,471,100	18,163,856	18,439,974	.....
China	16,534,500	a15,432,200	.....	.....
Canada	14,512,829	15,012,178	13,594,984	13,209,371
New South Wales	10,897,134	11,663,865	11,663,865	.....
Transvaal b	7,591,619	8,191,243	7,778,706	7,557,771
Spain	4,559,453	4,731,647	4,897,360	5,358,670
New Zealand	2,438,929	2,115,834	2,548,664	.....
Holland	1,901,902	2,064,608	1,763,696	a1,884,000
Chile	1,470,917	1,362,334	.....	.....
Queensland	1,010,426	1,162,497	1,180,825	.....
Mexico	982,396	.....	.....	.....
Bosnia and Herzegovina	940,174	927,244	.....	.....
Turkey	909,293	.....	.....	.....
Italy	731,720	772,802	861,265	.....
Victoria	664,334	668,524	691,640	.....
Orange Free State e	525,459	609,973	699,217	727,537
Dutch East Indies	622,669	453,136	440,905	.....
Indo-China	471,259	.....	.....	.....
Servia	335,000	.....	.....	.....
Sweden	397,149	401,199	410,636	.....
Western Australia	330,488	351,687	.....	.....
Peru	307,461	301,970	.....	.....
Formosa	306,941	.....	.....	.....
Bulgaria	324,511	.....	.....	.....
Rhodesia	216,140	237,728	.....	.....
Roumania	.....	.....	.....	.....
Korea	.....	.....	.....	.....
Tasmania	59,987	61,648	68,130	66,000
British Borneo	.....	49,762	128,505	.....
Spitzbergen	.....	.....	.....	.....
Brazil	.....	.....	.....	.....
Portugal	16,938	27,653	.....	.....
Venezuela	a12,000	13,355	.....	.....
Switzerland	.....	.....	.....	.....
Philippine Islands	2,998	.....	.....	.....
Unspecified	.....	.....	.....	.....
Total	c1,377,000,000	c1,478,000,000		

a Estimated. b Transvaal includes Natal and Cape of Good Hope and figures given are of coal sold only. c Approximate. d Hungarian production estimated at 10,000,000 short tons. e Represents coal sold only; probably 10 to 12% less than production.

Note—This table is based on a compilation of the U. S. Geological Survey, supplemented by some later statistics. Most of the figures given for the years 1914 and 1915 are obtained from other sources and represent the best information available at this writing.

quarter 3,175,687 tons, the third quarter 4,011,720 tons and in the last 4,110,528 tons. The Charleroi district is the leading producer, outputting 5,970,263 tons of coal, 129,974 tons of coke and 773,174 tons of briquettes.

Quite a number of the coal operators remained at their posts after the German invasion, immediately following which there was much distress over the lack of employment. In order to assist relieving this the owners coöperated with the German authorities to reopen the mines and provide employment. The entire production is handled through the German Central Bureau at Antwerp, which fixes prices, makes collections and turns the proceeds over to the coal owners, deducting a slight commission to cover expenses.

France

No authoritative figures concerning the performance of the French coal industry have appeared since the outbreak of the war, but it is estimated that production is being maintained at the rate of approximately 20,000,000 tons per annum, which is about one-half the normal output. In addition to this loss of 20,000,000 tons, France ordinarily imports this much more, so that the total apparent deficiency amounts to approximately 40,000,000 tons. It has developed, however, that consumptive requirements have been appreciably restricted by the slowing down in industrial activity incident to the war operations, this curtailment approximately equaling the loss in production of the French collieries. It thus appears that it is only necessary for France to maintain her normal imports to be assured of an adequate supply.

IMPORTS AND EXPORTS OF THE UNITED STATES

	December		Twelve Months		
Imports:	1914	1915	1913	1914	1915
Anthracite, total	12	173	921	19,347	2,998
Bituminous, total	168,035	175,023	1,413,857[2]	1,375,316	1,521,237
United Kingdom	10,992	1,174	6,141	27,421	18,361
Canada	112,759	167,131	1,096,924	1,050,592	1,253,829
Japan	19,170	5,400	117,483	75,109	86,919
Australia	25,114	1,218	188,613	219,941	159,241
Other countries	.....	100	4,696	2,253	2,887
Coke	5,915	4,047	93,507[2]	120,777	47,520
Exports:					
Anthracite total	184,467	295,694	4,154,386	3,830,244	3,542,971
Canada	182,349	282,394	4,083,333	3,767,774	3,440,009
Argentina	.....	57	.....	.....	2,526
Brazil	.....	.....	.....	6	2,415
Uruguay	.....	.....	84	.....	605
Other countries	2,118	13,243	70,969	62,464	97,416
Bituminous total[1]	696,546	1,161,936	17,986,757	13,801,850	16,762,283
Italy	.....	184,400	.....	.....	2,931,581
Canada	428,777	629,289	13,496,190	9,170,901	8,354,375
Panama	15,800	34,337	489,761	267,598	515,341
Mexico	35,266	14,343	477,046	359,802	276,433
Cuba	62,733	131,448	1,275,538	1,074,825	1,165,871
West Indies	28,596	62,164	608,762	552,600	529,423
Argentina	9,305	27,646	70,048	241,248	786,967
Brazil	17,090	38,831	279,933	278,026	617,304
Uruguay	.....	6,107	16,858	76,088	158,201
Other countries	98,979	33,371	1,272,621	1,780,762	1,426,787
Total coal	881,014	1,457,630	22,141,143	17,632,094	20,305,254
Coke	48,389	73,036	881,603	592,487	799,444
Bunker coal	490,931	564,352	7,700,520	7,266,002	7,464,630

[1] Beginning Oct. 4, 1913. [2] For part year only.

This, however, has proved a serious problem, since about one-third of the importations normally originate in Belgium and Germany, both of which sources of supply are naturally eliminated now. The remainder, about 11,000,000 tons per annum, is usually obtained from Great Britain, and in addition to this she has succeeded in making up the deficiency from Belgium and Germany in a most impressive manner, the French imports from Great Britain for the year amounting to 17,500,000 tons, as compared with 12,330,000 tons during the preceding year. However, the market has been characterized throughout the period by steadily advancing prices, and requirements have been met only by exercising the most vigorous action.

The French production for 1914 amounted to 29,786,505 tons, which compares with 40,843,618 tons for the preceding year. The loss was confined chiefly to the second half, during which time war operations were initiated, the tonnage for that period amounting to only 9,347,713 tons, as compared with 20,438,792 tons for the first half.

Germany

The German coal production in 1915 amounted to 146,712,000 tons, as compared with 161,535,000 in 1914 and 191,511,000 in 1913, the last normal year preceding the war. In addition to the coal production there were 88,369,000 tons of lignite produced in 1915 and 26,359,000 tons of coke, besides a trifle less than 30,000,000 tons of briquettes.

Conditions in the coal industry are regarded as very satisfactory, in spite of the fact that fully one-third of the miners have been called into service in the army. The gross production naturally shows a heavy decline, but it is interesting to note that the output of lignite coal is the highest on record, exceeding that for the preceding year by nearly 5,000,000 tons and the previous high record of 1913 by more than 1,000,000 tons.

The scarcity of labor is being made up as far as possible by replacing the outside men with women and boys, so that the former can work on the inside, while a great many prisoners of war are also being employed underground. The increased cost of living has resulted in wage advances, high-class workers in the vicinity of Essen now receiving about $1.75 per day of eight hours, as compared with $1.50 at the beginning of the war.

The coal handled by the syndicate during 1915 amounted to 73,984,097 tons, which compares with 84,809,916 tons in 1914.

Great Britain

The year 1915 witnessed a constantly increasing demand for coal, with an equally persistent decrease in the available supply. The chief difficulties were the inadequate supply of railroad cars, supplemented by an acute congestion, the heavy enlistment from the coal-mining region and the scarcity of mine timbers. Consumption, on the other hand, was at a maximum rate, due to an abnormal expansion in industrial operations throughout the country, and the year-end found the collieries all sold ahead for some time, while there was still a considerable demand to be met.

Prices advanced with such alarming rapidity over the first half of the year that the government was forced to establish a maximum level at about $1 above the maximum advance in 1914, though many large contracts had already been concluded at $1.45 to $1.70 above these figures.

The year was marked by many difficulties in the labor problem. Because of a sharp increase in the cost of living the Miners' Federation of Great Britain demanded a general advance of 20 per cent. in wages, and in May a compromise was effected by the English conciliation board on an increase of 15½ per cent., which was supplemented by a further increase of 5 per cent. at a later date. In spite of these awards, labor conditions continued much disturbed throughout the year, the situation reaching acute stages at times, as for instance the strike of the Welsh miners at a time when supplies were urgently

required by the fleet. The difficulty apparently lies in the fact that wages are at a point where the workers can obtain sufficient to satisfy their requirements at a minimum effort; as a result there is a general tendency to shirk work, which, supplemented by the heavy drain from the miners' ranks for army service, has seriously crippled the output of the collieries.

A study of the British export trade for the year 1915 is of particular interest to American coal operators because of the numerous openings afforded them by the restricted trade of Great Britain in the world's coal markets. The history of the British foreign coal trade shows a practically uninterrupted increase from about 16,000,000 tons in 1873 to 98,000,000 tons in 1913, the gross shipments during this 40-year period amounting to nearly 2,000,000,000 tons, or about 40 per cent. of the total production of the country. The opening of the war in 1914 caused the first important break in this progressive increase, the loss in tonnage as compared with the preceding year amounting to over 27,000,000 tons. For 1915 this loss was increased to more than 38,000,000 tons, or more than one-third of the gross exports, if due allowance is made for the normal increase which might have been reasonably expected during this period.

A compensating factor for the British in their export trade is a substantial increase in the prices ruling on this business as compared with normal times. The average value per ton of the coal sold in the export trade in 1915 was $4.10, as compared with $3.35 in 1913, the last normal year preceding the war. Exclusive of the coal sold for bunkering purposes and in the coastwise trade, the gross value of the British fuel exports for 1915 amounted to approximately $180,000,000.

Reductions in export are general to all countries with the exception of France, which took about 5,000,000 tons more in 1915 than in 1913. The heaviest declines of course are to enemy countries, Germany, Austria and Turkey, which together normally absorb from ten to twelve million tons of British coal and to which might also be added Russia, which has been practically cut off entirely from British shipping.

Greece

The fuel problem in this country has become of importance in the United States, for the reason that the first shipments ever made were sent over during 1915, the initial cargo consisting of 6,000 tons of Pocahontas coal for delivery to the P. A. P. Ry. It was generally understood that the Greek Government concluded a contract for 200,000 tons of American coal during the year. The Greek imports in 1914 amounted to 432,405 metric tons, showing a decline of 71,268 tons from the preceding year.

Holland

This country depends almost entirely on Great Britain and Germany for its fuel supply and the restrictions in exports from both of these latter countries have created a serious condition in Holland. The imports for 1914 showed a decline of 2,453,000 tons, as compared with the previous year, the respective figures being 11,281,782 tons in 1914 and 13,734,843 tons in 1913.

Some test cargoes were shipped from the United States in 1915, which, it is estimated, were delivered at a price of $12 a ton, this comparing with about $8 a ton for the British and German products, these selling in normal times at approximately $4 per ton. Since, however, it has been more a question of getting supplies than of price, Germany having put in a regulation restricting exports by one-third, there is still a possibility of American coal finding a market.

Imports for 1915 indicate the development of a heavy shortage, the figures for the first nine months being only 5,498,056 tons, as compared with 9,527,313 tons for the same period in 1914 and 10,184,354 tons in 1913. This loss, however, is overcome in a large measure by the practical cessation of exports, which amounted to only 240,412 tons during the first nine months of 1915, as compared with 3,583,230 tons in the same period in 1914.

Italy

American coal shipments to this country have increased at a rate never before witnessed in the history of our export trade, due entirely to the restricted movement from Great Britain which normally furnishes about nine-tenths of the country's requirements. The advent of the war curtailed British exports to Italy by nearly one-half, the coal tonnage for 1915 being only 5,788,460 tons, as compared with 9,647,161 tons for 1913, the last normal year. Imports from the United States for 1915 amounted to 2,931,581 tons, as compared with practically nothing for previous years.

EXPORTS FROM GREAT BRITAIN*

To	December			Twelve Months		
	1913	1914	1915	1913	1914	1915
Russia	400,315	.....	.....	5,998,434	3,087,805	42,559
Sweden	379,522	291,039	171,787	4,563,076	4,250,255	2,659,995
Norway	201,951	179,562	185,518	2,298,345	2,462,200	2,643,187
Denmark	294,685	225,520	216,165	3,034,240	3,059,162	3,130,642
Germany	655,841	.....	.....	8,952,328	5,256,765	.....
Netherlands	148,598	90,634	137,915	2,018,401	1,722,215	1,792,951
Belgium	140,761	1,008	.....	2,031,077	1,168,554	.....
France	1,099,553	1,246,786	1,386,299	12,775,909	12,330,545	17,601,572
Portugal[1]	129,485	84,853	84,403	1,356,081	1,169,625	1,022,755
Spain[4]	293,858	148,132	158,046	3,648,760	2,940,148	2,067,763
Italy	802,488	759,477	382,496	9,647,161	8,625,254	5,788,460
Aus.-Hung.	78,728	.....	.....	1,056,634	564,362	.....
Greece	61,042	44,594	.....	727,899	578,757	309,198
Roumania	25,722	.....	.....	251,925	218,218	.....
Turkey	61,951	.....	.....	369,789	429,506	10,324
Algeria	107,169	53,649	93,011	1,281,664	910,211	939,846
Portugal[6]	19,187	25,732	18,070	233,015	184,686	210,652
Chile	46,523	2,933	119	588,526	377,482	46,407
Brazil	155,208	75,216	28,462	1,886,871	1,176,780	498,340
Uruguay	66,143	9,385	32,998	723,936	550,876	332,541
Argentina	380,859	194,499	163,606	3,693,572	2,883,064	1,618,603
Channel Is.	14,636	9,051	14,007	167,862	162,066	131,110
Gibraltar	33,703	34,835	21,817	354,702	309,650	356,075
Malta	78,622	4,925	18,740	700,111	338,673	151,153
Egypt[2]	358,847	177,511	130,738	3,162,477	2,633,581	1,388,914
Aden[3]	26,664	4,004	5,104	181,204	139,821	132,475
India	27,189	7,054	50	179,192	158,261	24,536
Ceylon	26,115	5,495	.....	239,657	250,173	43,487
Miscell'ous.	114,088	22,980	37,891	1,277,270	1,101,185	591,226
Coke	118,619	107,442	101,168	1,235,141	1,182,848	1,010,302
Briquettes	178,235	73,077	81,826	2,053,187	1,607,757	1,225,071
Total	6,526,307	3,879,393	3,470,236	76,688,446	61,830,485	45,770,144
Bunker	1,842,006	1,248,215	953,878	21,031,550	18,535,616	13,630,964

* The figures do not include Admiralty and certain other shipments.

[1] Includes Azores and Madeira. [2] Including Anglo-Egyptian Sudan. [3] And dependencies. [4] And Canaries. [6] West Africa.

For the eleven months ending June, 1915, Italian receipts of coal amounted to only 6,278,000 tons, as compared with 8,507,000 tons for the same period preceding the war. Industrial activity has of course been materially restricted, so that the consumption is less than in normal periods, but it is none the less evident that Italy has at times been hard pressed for adequate supplies. For the first nine months of 1915 the imports totaled 6,157,365 tons, which compares with 7,547,082 tons in the corresponding period of 1914 and 7,966,633 tons in 1913. Genoa is one of the chief importing ports, the total receipts for 1915 amounting to 2,665,351 tons, as compared with 3,168,035 tons in 1914 and 3,192,299 tons in 1913. Heavy imports are also received at Savona, the 1915 tonnage amounting to 1,107,927 tons, as compared

with 1,265,362 tons and 1,246,780 tons the two preceding years.

The Italian production of coal is relatively insignificant. The output for 1914 was: Coal, 781,330 tons; coke, 1,276,318 tons; briquettes, 968,600 tons; which compare with the figures for 1913 as follows: Coal, 701,081 tons; coke, 1,336,382 tons; briquettes, 896,091 tons. There were 46 mines operating in 1914 and 40 in 1913.

New Zealand

The production of New Zealand for 1914 showed a very substantial increase, amounting to 2,275,593 tons in 1914, as compared with 1,888,005 tons in 1913. The exports for 1914 amounted to 302,900 tons, as compared with 211,750 tons in 1913, and the imports for the same periods were, respectively, 518,000 tons and 469,000 tons. The output of the state colliery for 1914 amounted to 200,188 tons, exceeding that for the preceding year by 3,906 tons. Of the gross production for New Zealand in 1914, 1,422,315 is designated as bituminous and semibituminous and the balance pitch coal, brown coal and lignite.

Norway

The Norwegian coal and coke imports in 1914 amounted to 2,749,000 tons, as compared with 2,482,000 tons in 1913. For the first half of 1915 the imports show a gain as compared with 1914, the respective figures being 1,641,000 tons in 1915 and 1,366,000 tons in 1914. By far the largest proportion of the imports originate in Great Britain, though it is noted that Spitzbergen coal is growing rapidly in favor. Practically no American coal is exported to this country.

Russia

The production of coal in European Russia in 1915 amounted to 27,820,000 tons, as compared with 32,513,000 tons in 1914 and 33,204,000 in 1913. The production in Asiatic Russia amounted to 2,798,528 tons in 1915, as compared with 2,442,944 tons in 1914 and 2,153,648 tons in 1913. The Donetz Basin district continues far in the lead as the chief coal-producing district, outputting 26,084,856 tons in 1915, as compared with 27,065,248 tons the year before. The Dombrova district shows a heavy decline from 6,846,672 tons in 1913 to 3,712,632 tons in 1914 and nothing in 1915.

The loss of tonnage from the Dombrova district, together with the cessation of imports, restricted the amount of coal available for the market during 1915 by 15,268,000 tons, though this was partially compensated for by a reduction in the consumptive requirements of 8,036,000 tons owing to the German occupation of Poland and the Baltic Provinces and further by an increase in the amount of fuel oil available equal to several hundred thousand tons of coal. The coal imports in 1915 amounted to only 80,360 tons as compared with 5,416,000 tons in 1914 and 8,807,000 tons in 1913.

The scarcity of labor has tended to restrict the production, in spite of the fact that there are some 16,000 prisoners of war employed in the coal mines of the Donetz Basin district. This district alone usually employs in normal times approximately half a million persons, of which 16,000 are females and males under age. The inadequate supply of transportation facilities is also interfering seriously with the coal industry, it being estimated that though the Donetz Basin district will be prepared to output over 33,000,000 tons in 1916, it will be difficult to transport more than 16,000,000 tons.

The coke production of European Russia for 1915 amounted to 4,001,000 tons, which compares with 4,467,000 in 1914. It is estimated that the production for 1916 will amount to 6,601,000 tons.

Spain

The high prices and scarcity of coal in all export markets proved an incentive to domestic producers to increase their production during 1915, with a result that a new high record was established, the output of coal being 4,234,798 tons, as compared with 3,905,080 tons the preceding year and 3,783,214 tons in 1913. The anthracite output increased from 228,302 tons in 1914 to 252,483 tons in 1915, and the lignite production from 309,453 tons to 347,072 tons for the same years.

The heavy decline in imports has developed a very serious problem in Spain. The imports normally originate in Great Britain exclusively; the British exports to Spain and the Canaries in 1913 amounted to 3,648,760 tons, 2,940,148 tons in 1914 and only 2,067,773 tons in 1915.

The chief producing district of Spain is Oviedo, from which the output was 2,700,000 tons of coal in 1915, as compared with 2,457,613 tons the year before.

Sweden

Sweden has a very small coal production, the output for 1914 amounting to only 366,639 tons, as compared with 363,965 tons during the preceding year. The output originated entirely in 15 mines in the Scania district. The coal consumption in 1913 was estimated at 5,763,000 tons. Imports for the first six months of 1915 totaled 2,242,905 tons, as compared with 2,134,508 tons for the same period in 1914. In the last half of 1915 coal imports totaled 2,796,439 tons, making the total for the year 5,039,344, which compares with 5,064,371 tons in 1914 and 5,374,720 tons in 1913.

South Africa

The total coal sold in the Union of South Africa for the year 1915 amounted to 8,281,311 tons, which compares with 8,477,923 tons in 1914 and 8,801,216 tons in 1913. Most of the production originates in the Province of Transvaal, the amount sold from there in 1914 being 5,157,268 tons, as compared with 5,225,036 tons in 1913.

The fuel imports into this country, while not important, have shown a very sharp decline, the total for the first half of 1915 amounting to only 9,382 short tons, as compared with 28,201 tons for the same period in 1914. The importations of coke and patent fuel have been more nearly normal, the total for the first six months of 1915 being 11,754 tons, as compared with 10,956 tons in 1914. The exports form quite an important part of the fuel industry and showed a heavy decline for the first half of 1915, the total being 755,134 tons, as compared with 1,057,007 tons in 1914.

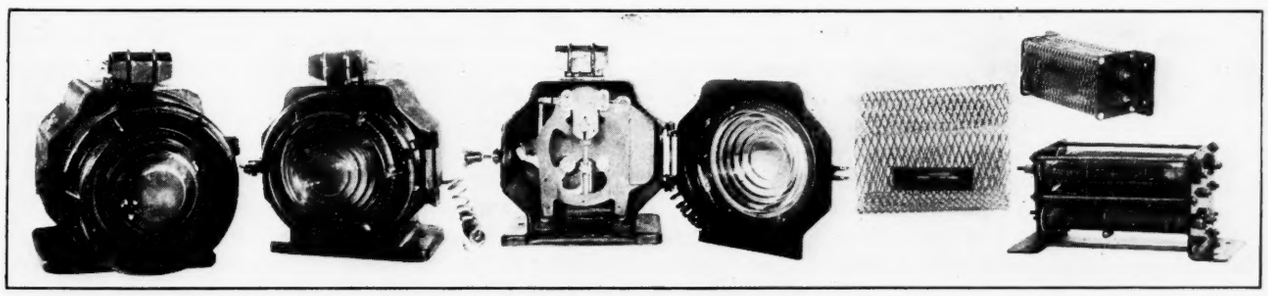
A Car Fell on a Cage Being Hoisted and killed 10 men who were in the upper deck. This occurred at the Low Hall colliery, Lancashire, England. The shaft is an upcast and is inclosed, the casing being provided with sliding doors which are raised by the cages and fall by their own weight when the cage leaves the surface. On this occasion the fall of one of the doors was delayed, and a car which was not controlled in any way ran backward into the shaft and fell 450 yd., colliding with the rising cage.

Arc and Incandescent Headlights

By P. S. Bailey*

SYNOPSIS—The old incandescent headlights provided with white enameled reflectors were excellent markers, but would not project light beams for any great distance. Improved apparatus is now available which is not overly extravagant of current, yet which renders such an object as a man visible when several hundreds of feet away.

Modern methods of mining, wherein the electric locomotive is almost universally employed for haulage, both for gathering and on the long hauls to and from the entrance of the main tunnel, make imperative the use of headlights with satisfactory illuminating power. Legislation affecting the employer's liability is becoming more stringent in its character, and illuminants which were much in vogue only a few years ago are now under criticism and will soon be relegated to the scrap heap. The use of efficient headlights, which are now operating in many of the best-equipped mines, secures a source of protection to the employer which he cannot afford to ignore, often preventing possible litigation which might otherwise be incurred through injury to employees.



FIGS. 1 TO 4, SHOWING VARIOUS HEADLIGHTS, MECHANISM POSITION AND DISASSEMBLED STANDARD RESISTANCE

A thorough investigation by the General Electric Co.'s engineers into the requirements of mine illumination, of which the locomotive headlight is a most important part, has occasioned the design of a complete line of headlights for locomotives, a description of which follows.

Fig. 1 shows a headlight in which advantage is taken of the highly efficient luminous arc generally used in street and "White Way" lighting throughout the country. This unit is composed of a solid cast-iron frame with a hinged cast-iron door of rugged construction. The door is also provided with a projecting circumferential cast-iron ledge for guarding the lens against falling rock or other external blows. It is fitted with a cowled chimney and a baffled intake feature, which permits of thorough ventilation of the casing and disposes of the fumes liberated by the luminous arc. The door in this case is fitted with a 10-in. clear optical semaphore lens having an 8-in. focus, which performs the function of concentrating the light rays from the arc by refraction into a far-reaching, nearly parallel beam.

The mechanism consists of a galvanized iron skeleton frame with magnetic shield, upon which is mounted a simple solenoid actuating an armature, by means of a clutch and clutch rod, controlling a combination link and counterweighted lever, which are connected with a pivoted lower electrode holder in which is placed the negative electrode. A cylindrical chimney attached to and insulated from the frame supports the practically nonconsuming upper or positive copper electrode with a cylindrical brass sheath to prevent oxidation from the heat of the arc.

When the current is turned on, the solenoid, becoming energized, lifts the armature controlling the link and lever mechanism, and the lower electrode is drawn away from the upper to a fixed position. A phosphor bronze setscrew and nut attached to the frame is provided for limiting the length of the arc, which is fixed at ½ in. for 550 volts and ⅜ in. for 250 volts. The mechanism and frame are held in the casing by a machine screw, which enters through a clearance hole in the back of the casing and threads into the frame.

The frame and mechanism may be easily removed by withdrawing the machine screw, opening the door and pulling the frame forward, as the casing is provided with a track under which the frame slides. The track also serves as an auxiliary holder, keeping the mechanism firmly in position at all times. The total weight of the unit is 69 lb. Considerable attention has been paid to the efficient design of the solenoid, or lifting magnet, so that the arc can be maintained at from 40 to 50 per cent. below normal voltage with the rheostat adjusted for 100 per cent. line voltage conditions.

Fig. 5 shows the apparent beam candlepower and the angle of spread obtained from two different electrodes. Foot-candle readings were taken with a Sharpe-Millar photometer at a distance of 300 ft. from the headlight, and the foot candles multiplied by the square of the distance which is the accepted practice in obtaining these values. All other curves shown in this article are computed in the same manner.

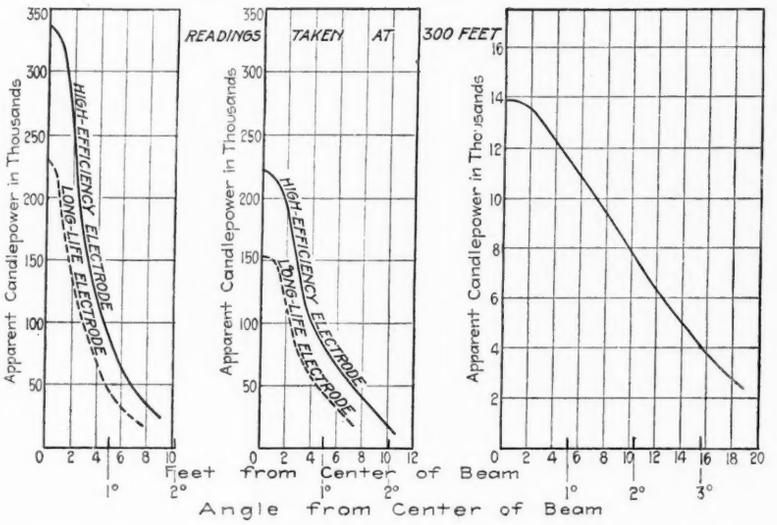
The full line curve shown in Fig. 5 gives photometric values obtained with a high efficiency electrode, while that shown by the dotted line gives values for the long life electrode, which is furnished in standard practice. Increased efficiency is obtained at the expense of life. The high efficiency electrode has a burning life of 40 to 45 hr., while the standard has a life of 50 to 75 hr.

Assuming that it is desired to discern an object the size of a man in dark clothes against a gray background on the track directly in front of the locomotive under

*Schenectady, N. Y.

clear atmospheric conditions, the pick-up distance for this headlight is from 1,000 to 1,200 ft. ahead with the standard electrode and 1,300 to 1,500 ft. with the high-efficiency electrode.

Fig. 2 depicts this headlight equipped with an 8⅜-in. diameter clear optical semaphore lens, and Fig. 6 illustrates the apparent beam candlepower and angle of distribution of this headlight so equipped. In this case the pick-up distance under clear atmospheric conditions is from 800 to 900 ft. with the standard electrode and 900 to 1,000 ft. with the high-efficiency electrode. The headlight equipped with the 8⅜-in. lens permits of the use of a smaller door, on account of the shorter focus of 5 in., and thus the weight of the headlight is reduced to 65 lb.



FIGS. 5 TO 7. APPARENT BEAM CANDLEPOWER AND ANGLE OF DISTRIBUTION OF LIGHT

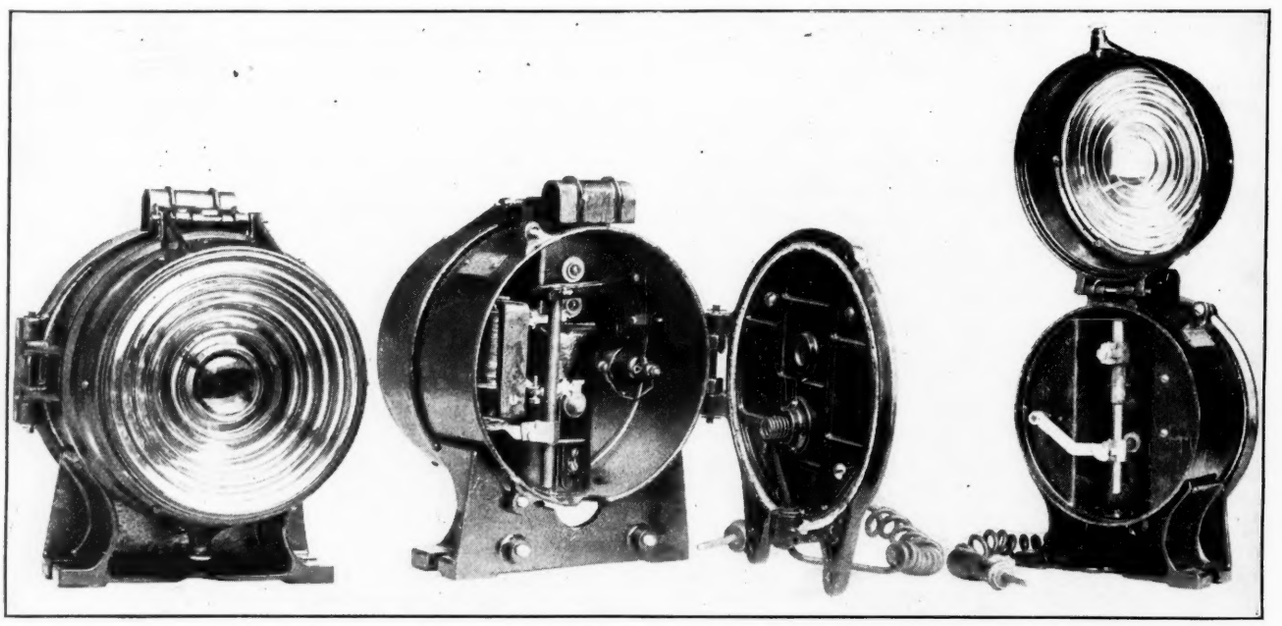
A glance at Fig. 3 gives an idea of the manner in which the frame and mechanism of the headlight are positioned in the casing, the elements of the electrode, link and lever mechanism being in view, while the magnet is mounted in the rear of the magnetic shield, which prevents any deterrent magnetic influence, caused by stray flux from the magnet, from interfering with the operation of the arc.

The lower electrode consists of a hollow cylinder of sheet iron rolled up and welded, plugged at one end and filled with a mixture of certain oxides which produce the highly efficient luminous arc. The tube, when filled, is capped with a metal disk and the edges are spun over to hold it in position. When the arc is struck, the disk burns away rapidly and the electrode is self-sealing.

Fig. 4 shows a disassembled view of the steadying resistance used with headlights on 550-volt lines. It is composed of 5 edgewise units, which are made up of flat strip winding, laid on edge and wound on an arbor. These coils are spread slightly and filled with a plastic insulating compound between the turns. They are then pressed together and fired in a high-temperature oven so that they will resist the ravages of overheating, and in fact may be run at red heat without serious harm. A similar resistance is used on 250- or 220-volt lines, except that the number of units is reduced from 5 to 2. The rheostat is protected from blows by means of a meshed wire screen. The units are firmly mounted in position between two punched-steel plates.

The headlights, as described, have been designed primarily for use in the long hauls where the loaded and unloaded trains are operated at comparatively high speeds. There is, however, another field for a lower powered headlight, and for this reason a unit has been designed operating substantially on the same principle as those already described, but with a lower rating. This is for use on locomotives making the short hauls and gathering.

Figs. 8, 9 and 10 show a headlight provided with a two-compartment casing in which the elements of the clutch mechanism are contained in the back compartment



FIGS. 8 TO 10. VIEWS OF A HEADLIGHT WITH A TWO-COMPARTMENT CASING

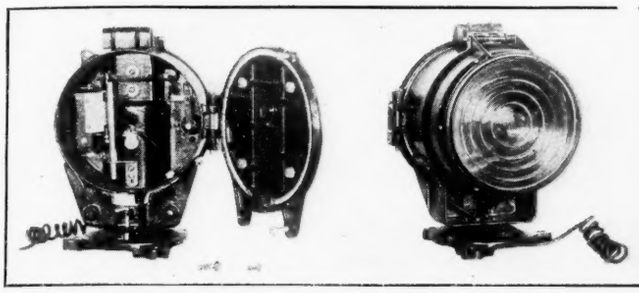


FIG. 11. HEADLIGHT WITH A TURRET BASE

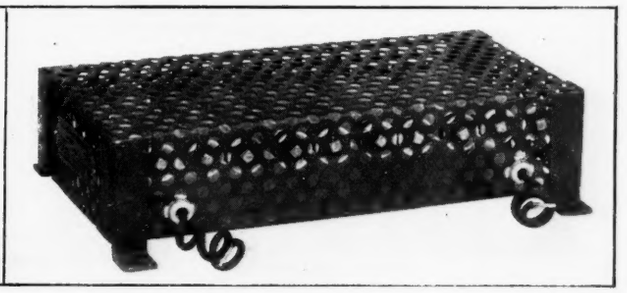


FIG. 12. RHEOSTAT FOR A TWO-AMPERE HEADLIGHT

of Fig. 9 and the elements of the electrode mechanism in the front compartment of Fig. 10, while Fig. 8 shows the lamp with the front and rear compartments closed.

The advantage of the two-compartment casing is apparent, in that the mechanism is in a dustproof inclosure, being at the same time easily accessible, and the iron partition serves as a magnetic shield for the arc. The headlight, it will be noted, is equipped with an 8⅜-in. clear inverted semaphore lens, which, when it is desired to cut down the overall depth of the unit, is advantageous, as the depth of the protecting circumferential ledge is decreased, since the depth of the lens is less than those of the regular optical type.

Where there is small space in which to mount the headlight on the locomotive, this type is recommended because of its limited overall dimensions. The total weight is 34 lb. 8 oz. The 8⅜-in. diameter clear optical semaphore lens may be used if desired, although this is somewhat deeper than the inverted type and cannot be as well protected. There is, however, a slight advantage in concentration in favor of the convex optical lens, while it presents a smooth front which will not collect dust as quickly as the serrated face of the inverted lens.

This headlight is designed to operate with a current of two amperes flowing through the arc, the length of the arc being set to $\frac{9}{16}$ in. for 550-volt line conditions. It will operate on minimum line voltage as low as 65 per cent. of normal. Fig. 7 gives a curve showing the apparent beam candlepower and maximum angle of distribution of this headlight taken at a distance of 300 ft., when equipped with an 8⅜-in. clear optical semaphore lens having a focus of 5 in. The average pick-up distance for this unit when equipped, as shown in Fig. 10, is from 500 to 700 ft., in front of the locomotive, the object, condition of atmosphere and background being the same as previously referred to.

In the majority of instances in mining practice, locomotives are provided with a double end equipment, consisting of two headlights, a single rheostat and two snap switches with fused cutouts. The negative leads of the headlight are grounded, while the positive leads are connected to the supply side of the rheostat, and the feeder side of the rheostat is connected directly to the trolley circuit.

There are conditions, however, which make it desirable to use a single headlight, where there is not room to mount two, one at either end of the locomotive. The use of a single headlight immediately makes it necessary that the beam be directed in either direction toward which the locomotive may travel. For this reason a headlight similar in every way to that shown in Figs. 8, 9 and 10, with the exception that a turret base has been added, as shown in Fig. 11, has been developed. This headlight, it will be noted, is equipped with a base casting with three slotted bosses located 120 deg. apart, by means of which the plate is fastened to the locomotive cover with bolts.

The casing of the headlight is provided with a suitable base casting which is pivoted to the baseplate. Care has been taken to provide a good bearing surface between the baseplate and the base casting so that the headlight proper cannot loosen and rock, causing wearing at this point or undue vibration. A locking pin is provided, and there are bosses on the baseplate and the base frame which permit of rotating the headlight on its vertical axis 180 deg. Suitable clearance holes for the pin are drilled in the baseplate at points 180 deg. apart so that the lamp may be locked in position. The weight of the turret base headlight is 34 lb. 8 oz.

It is desirable on lines of 250 to 220 volts that the overhead construction and rail-bonding be in good condition, otherwise the line drop in remote sections of the mines will be excessively high and the line voltage correspondingly low. Good overhead construction and returns add to the efficiency of all mining equipment, including the locomotive headlight.

Fig. 12 shows a type of rheostat used with two-ampere headlights for 550-volt operation. In this instance the current value is too low for a successful design of edgewise-wound rheostat, so that in this case the units are of cylindrical porcelain 1 in. in diameter, wound with high-grade noncorroding resistance wire. Five units are used when 250-volt operation is required and 10 units for 550-volt operation. All of the units are laid in the same horizontal plane, which promotes the design

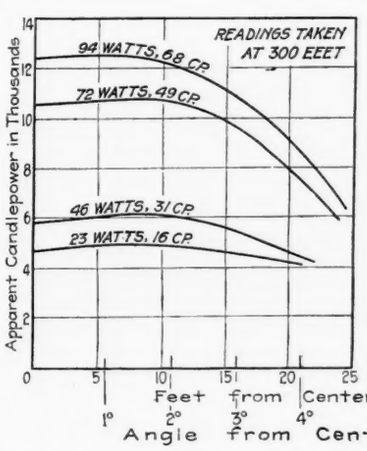

READINGS TAKEN AT 300 EEET
94 WATTS, 68 CP.
72 WATTS, 49 CP.
46 WATTS, 31 CP.
23 WATTS, 16 CP.
Apparent Candlepower in Thousands
Feet from Center of Beam
Angle from Center of Beam

FIG. 13. PHOTOMETRIC RESULTS WITH VARIOUS LAMPS

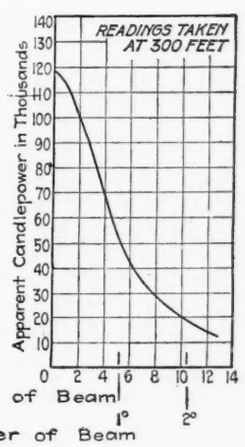


FIG. 14. RESULTS WITH 36-WATT LAMP

of a shallow rheostat, and the best of heat radiation and insulation. The rheostats are protected by perforated sheet-metal cases.

For a number of years past, many mining locomotives have been equipped with incandescent headlights, which, while serving their original purpose as markers, at the best may be considered inefficient in modern practice. These headlights are in the main composed of cast-iron casings with molded parabolas painted or fire-enameled white or with spun-metal reflectors.

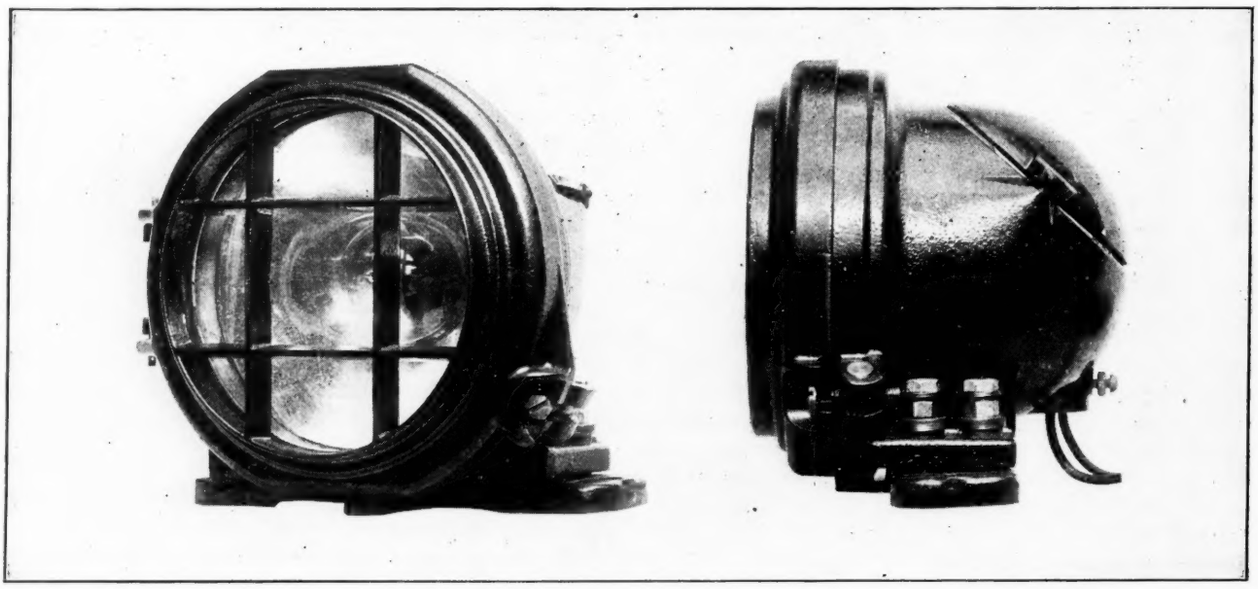
It is well known that white paint or white enamel is a good diffusive medium, but is of little use in the concentration or projection of light from a parabolic surface. Ordinary 110-volt or 250-volt incandescent loop filament lamps have been used, with no attention paid to concentration of the filament or efficiency in watts per candle of the lamp. Thus such headlights, while making good markers, are of no particular value in locating objects at a distance.

A novel incandescent headlight, in which electrical and lighting efficiency as well as economy of occupied space has been considered, is shown in Figs. 15 and 16. This headlight is composed of a solid cast-iron casing with hinged door, removable cast-iron cover and a sub-base. The casing is supported by means of eight spiral springs concealed from the eye and anchored by means of four studs firmly affixed in the baseplate, two on either side of the casing. The points of suspension, which are four, occur between each of the four pairs of springs so that shocks which might otherwise impair the filament of the lamp are reduced to a minimum.

Inside of the casing proper is mounted an 8¼-in. diameter clear parabolic glass mirror with a silvered back, this being cushioned by felt gaskets and held in position by an annular ring screwed to a flange on the casing. In addition a ball-and-socket focusing mechanism, composed of two clamping members with spherical clamping surfaces and a split ball ring with spherical surface to fit over the lamp socket is mounted in a position back of the reflector.

Access to the focusing mechanism is provided by removing the cover, previously mentioned and shown in Fig. 16, by simply removing two screws. Clamping of the mechanism is accomplished by means of a wing screw assembled through a clearance hole in one clamping member and threaded into a tapped hole in the other, one clamping member being rigidly mounted in the casing and the other being movable. By means of this focusing mechanism absolutely accurate results may be obtained which are impossible on less efficient devices of this nature.

It may be easily seen that adjustment along the horizontal axis through the vertex of the reflector, as well as along the vertical and horizontal axes through the focus and all radial adjustments, can be obtained. This is of special importance, as it is not always commercially possible to locate lamp filaments in exact positions in their respective bulbs.



FIGS. 15 AND 16. TWO VIEWS OF AN INCANDESCENT HEADLIGHT

Referring to Fig. 15, it will be noted that the headlight is equipped with a guarded door and a door pane of ¼-in. plate glass, designed to stand extremely rough service.

Fig. 13 shows photometric results obtained from this headlight with the following combinations of focus type Mazda B incandescent lamps: 105 to 125 volt, 23 watt, 46, 72 and 94 watts.

In general mining practice the 105- to 125-volt lamps will be more commonly used. These give a wide variation in beam intensity, as may be noted from the figure. It will also be noted that the resultant beam from the 6-volt 36-watt Mazda C lamp (see Fig. 14) is much more efficient than the others because of the higher degree of concentration of the filament as well as the increased efficiency in watts per candle of the lamp. It will be noted that this lamp would prove a satisfactory illuminant for storage-battery service. The pick-up distance for this headlight, when used with the 110-volt 72- and 94-watt lamps, is from 500 and 600 ft., so that with this particular lamp, in many cases, the headlight can be used on the long hauls, while with the lamps of

lesser wattages the headlight can be as well adapted for the short hauls.

A type of enameled unit rheostat may be employed as a steadying resistance for the various types of incandescent lamps when used on 550-volt circuits with the exception of the 6-volt 36-watt. It may be seen that on 250-volt lines, two 125-volt lamps may be easily employed without rheostat if desired. The weight of this headlight complete is 28 lb.

From the foregoing it may be seen that a considerable variety of both arc and incandescent headlights is available, which provide for any conditions that may arise in mining service. Any of these headlights may be furnished with colored lenses or door panes coloring the beam and thereby reducing the apparent beam candlepower to suit the requirements of the operator.

Flushing the Coal

At a certain plant there was a stockpile of pea coal containing possibly 10,000 tons. It was necessary to pass this through the breaker in order to prepare it for market. The pile had been built upon an old culm bank, which had been washed into a dragline and conveyed to the breaker. The dragline remained, and the coalpile touched it in places.

An attempt was made to wash the coal into the dragline, but this failed, since the water would disappear into the coalpile without moving the material.

Work was then started shoveling the coal into the dragline, but this was of course an expensive proposition. An improvised chute was then built of pieces of sheet iron, the first being forced well under the edge of the coalpile and the others overlapping each other and extending to the dragline. Over this chute the coal could be readily washed into the conveyor.

This improvised chute worked so well that a better one was soon constructed from strips of sheet iron 13 in. wide and slightly dished. These held the water better than the flat sheets, and practically the whole of the stockpile of pea coal was conveyed to the dragline in this manner, thus saving a considerable portion of the labor expense of handling the raw material to the conveyor line.

How Ore Shippers View the Coming Lake Season

Iron ore is again moving from the mines of the Lake Superior district to lower Lake ports. The operators and the vessel men are exceedingly anxious to start the season's work, as there is a lot of ore that will have to go down the Lakes during the year. Many estimates have been made as to the amount that the boats will handle this year, the guesses ranging all the way from 55,000,000 to 70,000,000 tons. It is quite certain the fleets cannot handle as much as 70,000,000 tons, and a fair estimate would place the movement at 60,000,000 tons. If the boats can get an early start and are able to operate late in the fall, it is thought that 60,000,000 tons, or close to that amount, can be handled.

The Steel Corporation took action early last fall and chartered a large number of vessels for this year (probably 10,000,000 tons' capacity) in addition to the fleet of 73 ships which it owns. Some of the other mining organizations that do not have fleets of their own followed suit and signed contracts. A few, however, who were not so forehanded will have trouble moving their ore.

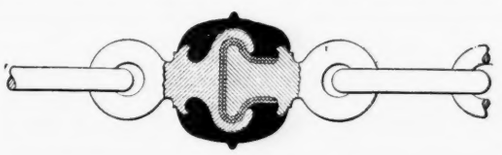
Rail and lake freights have been advanced; miners are commanding higher wages; materials are higher; in fact, nearly everything that enters into the cost of placing ore at lower lake ports has gone up, and the operators will receive only 25c. or 35c. more for their product than they did in 1915.—*Iron Age.*

Insulating the Mule

By J. A. Shaw*

In many coal mines electric power is used for haulage and cutting, but mules for gathering to the locomotives. Where these animals are thus employed, they frequently get shocked and sometimes even killed through the mine cars getting off the track and against the live wires. This is especially the case in mines operating in low and medium thick coal measures.

To overcome this difficulty a ball or conical strain insulator can be welded into the trail chain at or near



CROSS-SECTION OF STRAIN INSULATOR WELDED INTO CHAIN

the spreader ring. The strain insulator effectually prevents current passing along the trail chain to the mule from the drawbar of a car that may have come in contact with the feeder or trolley wire. Care must be taken when welding the links holding the strain insulator in place to make them long on each side of the insulator and to protect the insulator by wet burlap, asbestos or some other material which will not allow the composition of which the insulator is composed to be injured by the heat of welding.

A 5,000,000-Ton Foreign Inquiry for Coal

The International Resident Buyers, 33 Union Square, New York, have issued inquiries for bids on coal as follows:

150,000 to 200,000 tons steam coal, Pocahontas or New River, deliveries to be made during May, June, July, August, September, October. Quotations should be c.i.f. Italian ports and c.i.f. Marseilles.

400,000 tons Pocahontas or New River, to be delivered during the 12 months May, 1916, to April, 1917. Quotations should be c.i.f. Rouen, France.

2,000,000 tons Pocahontas or New River for delivery during the next two years. Quotations should be c.i.f. Marseilles.

1,000,000 tons Pocahontas or New River, for delivery during the next one year or two years. Quotations should be c.i.f. Genoa, Italy.

1,000,000 tons Pocahontas or New River, for delivery during the next one year or two years. Quotations should be c.i.f. Atlantic ports (French).

250,000 to 500,000 tons coal for delivery during the next 12 months. Quotations should be c.i.f. northern Spain ports.

*Rimersburg, Penn.

The Labor Situation

Anthracite Wage Conference

The anthracite wage conference continued the even tenor of its uneventful way on Apr. 18, when the demand for a 20 per cent. increase on all wage rates was considered. The representatives of the operators took up most of the session for the presentation of their case, but no statement was published as to how near the parties were to an agreement.

On Apr. 19 the subcommittee discussed the demands "as a whole." This was the first time the proposed agreement had been so considered. The importance of the occasion was emphasized by the presence in New York City of the full membership of the miners' tridistrict scale committee. The reason for their presence was not stated, but it foreshadowed the proposal of the operators' representatives, which was actually made on Friday, Apr. 21.

Tridistrict Convention To Meet at Pottsville

Immediately after the session concluded on the latter date a call was issued for a tridistrict convention of mine workers to be held in Dunn's Hall, North Centre St., Pottsville, at 10 a.m., Tuesday, May 2, at which time the scale committee will make its report.

The details of the proposition were closely guarded—even the members of the tridistrict miners' scale committee who had been in the city for several days were not let into the secret. It was said that the proposal would probably not be made public till there was a meeting of the tridistrict scale committee and the anthracite operators, at which all the details would be worked out.

The rumor leaked out, however, that the proposition was for a 5 per cent. increase in wages and an 8-hr. day; but when an attempt was made to get behind this statement no real progress could be made. "At whose expense is the 8-hr. day established, the miners or the operators?" was one of the questions, and another was: "Does the 5 per cent. increase apply to the mine workers as a whole or only to the miners?" Both operators' and miners' representatives resented questioning.

The heat of debate is shown by the fact that sessions were held on Saturday, Apr. 22, and on Sunday, Apr. 23. On Monday, Apr. 24, the discussion continued, and the belief was generally held that the arguments related chiefly to the recognition of the union.

How Offer Is Regarded in Schuylkill Field

A correspondent from the anthracite field in the Schuylkill region sums up his views of the situation as follows, but it is not safe at present to indorse their accuracy in view of the uncertainty of the exact proposition submitted by the operators:

While the union officials are fully authorized to accept tentatively the terms offered by the employees, they have taken the wiser course of letting the men decide the question for themselves. This will relieve them from comment of a derogatory character should a plan be followed which might later prove unacceptable to the men.

The proffered wage increase leaves the man who is paid an hourly wage in little better condition than before. The average inside company man draws a wage of slightly over $2. He will get a 5 per cent. increase for a day which is shorter by an hour than the time which he now works. The companies will see to it that he does not work 9 hr., as experience will doubtless prove that the market will not demand over an 8-hr. operation of the mines. So at best the company men will not receive as an average an increase of more than $2.50 per month.

Contract Miner Is Favored Son of Fortune

It is true that they will work less hours, but the reduction in time will not furnish them with any money to meet the rising cost of food. The miner who already has the shorter day and who gains a larger increase in wage because his pay is already large is still the favored son of fortune. He can afford to accept the offer, which is a nice increase for him; but the company man is not likely to be so well pleased.

Just now the day workers are feeling the scarcity of funds which follows short time at the mines. In this misfortune the contract miner fares better than the day worker, for he is allowed to prepare coal on at least one of the idle days in each current spell of idleness; but his fellow employee who gets a day wage is laid off every day that coal is not dumped.

In case of slow time due to an overstocked market the contract miners can nearly always make a living wage, while the day worker falls steadily into debt due to lower wage and badly broken time. So if the wage increase offered is as reported, the union leaders will have trouble in handling the disaffection of the day workers who have been clamoring for better pay even more loudly than for shorter hours.

Want 8-Hr. Day, but Don't Care to Pay for It

The latter will hardly be induced to admit that they have received a 17.5 per cent. increase in pay, because though it may work that way as figured by the hour, it will not bring any such increase per day or per month, which they feel is the proper way to reckon it.

At present the situation is somewhat relieved by the fact that the mine workers are leaving in large numbers to work in other industries. But they nearly all return to the mines, and after a year or two those who have gone will come back, perhaps sadder than when they left, for after all mine workers are more satisfactorily paid than industrialists of equal skill in other lines of endeavor.

The call issued for the convention to be held at Pottsville reads in part as follows:

The object of the convention will be to hear the report of the Scale Committee appointed at the tridistrict convention which convened at Wilkes-Barre, Penn., Sept. 7, 1915. Inasmuch as this will be a most important meeting, it is to be hoped that local unions will use great care in selecting as delegates members who they know will be well fitted to represent them.

Delegates shall be elected directly from the local unions and shall have one vote for 100 members or less, and an additional vote for 100 members or a majority fraction thereof, and no person shall be eligible as a representative who is not a miner or mine worker or employed by the organization, and unless he is a bona-fide member of the local union in the district where he resides.

Local unions that are in arrears for the two months preceding the month of May shall not be entitled to representation; or in other words, locals can only send delegates if they have paid up all dues prior to the month of March.

The members of the mine workers' organization are to remain at work pending the report of the scale committee, which will be made to the tridistrict convention.

The call was signed by Mr. White and by the president, vice-president and secretary of each of the three anthracite districts.

Break Results from Demand for Closed Shop

The break between the operators and miners which had been expected since the close of last week occurred at the session held Tuesday, Apr. 25, and at its conclusion the official statement announced that the subcommittee could not agree and that a report would be made at a meeting of the scale committees of miners and operators to be held at two o'clock Thursday, Apr. 27.

It was learned that four days had been spent by the members of the subcommittees discussing the demand for the recognition of the union and in a statement issued late at night by the operators it was shown that the break in negotiations has occurred because of the refusal of the operators' representatives to concede the demands of the miners for a closed shop.

The statement of the operators' representatives follows:

The cause of the disagreement between the miners and the operators at their meeting today was the demand of the miners for a closed shop and the compulsory collection by the operators of all dues and assessments which the United Mine Workers see fit to levy against their members. This demand by the miners and its rejection by the operators came after the latter had offered an agreement giving the miners a 5 per cent. increase in wages and giving to men now working 9 hr. an 8-hr. day with 9 hr. pay, equivalent to an increase of 12½ per cent. This offer is larger than that provided in the settlement recently made with the same organization in the central Pennsylvania bituminous field, which competes with the anthracite region.

Anthracite Operators Defend Public Interest

The operators maintain that the insistence by the miners on their demand for a closed shop is un-American, and that the forced collections of dues by the employer, known as the "check-off," is against the practice of every other labor organization in the country, and is, in effect, a demand on the part of the officers and organizers of the United Mine Workers of America for a guaranteed income, collected by the operators, and to be used by the organization in any way it desires.

Much as they realize the responsibility of the step they take, the operators believe that in rejecting the demand for a closed shop and the "check-off" they are protecting the institutions of the country as well as the public, without in any degree desiring to antagonize the interests or the principles of organized labor. This attitude on the part of the operators is in absolute accord with the decision of the Anthracite Strike Commission appointed by the President of the United States in 1902. On this same subject of complete recognition of the union the commission found as follows:

The Commission adjudges and awards: That no person shall be refused employment or in any way discriminated against on account of membership or nonmembership in any labor organization; and that there shall be no discrimination against or interference with any employee who is not a member of any labor organization by members of such a body.

There is a difference in opinion as to whether any contract which may later be signed must be made to date back to Apr. 1 so as to have retroactive force. The mine workers claim that the agreement of the subcommittees makes this provision binding on the operators, but the latter regard this stipulation as null and void.

Operators Favor Collective Bargaining

On Apr. 25 President White issued two statements, one immediately after the adjournment of the afternoon session and the other after he had been shown the statement of the operators. The first statement read:

I cannot believe that the anthracite operators will deliberately force a strike. By meeting with us here day after day they have apparently shown that they accept the principle of collective bargaining and realize that the men who risk their lives and health in the industry, as against the mere dollars of the owners, have a right to a voice in determining the conditions under which they shall labor.

In full confidence of the good faith of the operators the anthracite mine workers have continued work, although all about them they have seen fellow wage workers in other industries receiving large increases in wages and other beneficial working conditions.

The welfare of 176,000 men, their wives and children and the communities in which they live are at stake. If the operators want to be fair we can yet reach an agreement and thereby eliminate the possibility of any kind of industrial disturbance in the anthracite region. Thursday's conference will determine if they will do it.

Misrepresents Central Pennsylvania Contract

The second statement issued by Mr. White was as follows:

The contention of the operators with reference to the conditions in central Pennsylvania does not harmonize with the facts, for the operators and miners of that district, known as District No. 2, last week entered into a contract wherein the operators granted the advance set forth in the New York agreement.

In addition to this they adjusted a most serious evil which had existed in that field for many years when they agreed to relieve the miner of car pushing. This was a great improvement over and above the advance provided in the New York agreement, and another of still more importance was the grant to the miners of full and complete recognition, including the check-off, which means that 20,000 new members will be added to the membership in District No. 2.

They recognized the logic in the contention of the officers of the United Mine Workers, the organization which they rely upon to keep peace and maintain the contracts in the coal fields of that district.

The operators' statement that the Coal Strike Commission of 1902 settled the question of recognition of the union is not borne out by the facts. The records show that before the questions in controversy were submitted to arbitration the mine workers had to withdraw their demand for recognition of the union, and no argument was submitted to the commission to substantiate the miners' claim for union recognition.

But the commission on its own initiative, contrary to the agreement under which the controversy had been submitted to its consideration in its ultimate findings decided, to the surprise of all, to deal with the question, although unauthorized, and from that day on the operators have harbored the "bugaboo" of union recognition. Getting back to a comparison of the anthracite with district No. 2, I believe that the anthracite coal industry is amply able to bear the demands we are asking.

And Now They Envy the "Poor" Steel Worker

In support of their argument that the mine workers are entitled to an increase in wages the miners' representatives called attention to the fact that employees of the United States Steel Corporation have received increases in pay amounting to 20 per cent. and that the lowest paid laborer is now receiving $2.43 for a 10-hr. day. It was also pointed out that should the mine workers quit work many of them would leave the coal regions never to return to the anthracite mines, and as a result the labor shortage would be greater than ever before.

All the minor demands of the mine workers were thoroughly discussed during the conferences, but no decision had been reached because the conferees could not agree on what should be done with the three so-called cardinal demands.

A meeting of the full tridistrict board of mine workers was held at the Hotel Continental on Wednesday, Apr. 26, at which the course to be taken by the members at the joint conference on Thursday was discussed. It is said that the board decided to stand by the report of the subcommittee on the scale which report declared that an agreement could not be effected.

Pennsylvania Soft-Coal Mines

Every indication seemed at first to show that everywhere but in the Fourth Pool there would be no trouble at the soft-coal mines of Pennsylvania wherever the union was recognized. This was, of course, not absolutely certain, nor was it naturally to be expected. It will be remembered that two years ago the general principles on which an agreement was to be made were settled and then eastern Ohio fought over the details for over a year. The smaller matters often cause more trouble than the general proposition—the journey from the general to the particular is not without its own storms and difficulties.

There is less danger in central Pennsylvania because the agreement covers a smaller ground. The contract is more nearly particular than the McAlpin agreement and any adjustments are for small local areas to settle. In fact Indiana, Ohio, Illinois and western Pennsylvania are now hardly any more advanced than was central Pennsylvania when it learned what the McAlpin agreement would contain and started to contrive a contract roughly approximating its provisions.

Central Pennsylvania Men Abstain from Work

Strange to say, however, some miners in central Pennsylvania ceased to work after Apr. 20, claiming that the contract to continue working for a month after the assembling of the conference between miners and operators had reached its time limit and consequently the best thing they could do would be to loaf at home and so hurry the signing of papers.

As a matter of fact the miners themselves are delaying the settlement as much as the operators. Only a few miners appear to have taken the unreasonable stand that they are justified in abstaining from work, and the leaders are discouraging their idleness.

All Mines of Pittsburgh Coal Co. Are Idle

In the western Pennsylvania region all the 24,000 men employed at the 70 mines of the Pittsburgh Coal Co. went on strike because at the semi-weekly payday, Apr. 22, the increases provided in the agreement were not paid. The agreement between the miners and operators in western Pennsylvania has not been signed. The McAlpin agreement is only a blanket document prescribing roughly what the local agreement shall be. Consequently the Pittsburgh Coal Co. is not wrong in refusing to pay its men the new scale at the present time, nor are the miners wrong in protesting and striking, though the act in a sense violates the requirements of the Indianapolis convention.

The miners struck on Monday, Mar. 24, on the order of President Van Bittner and the executive board of district No. 5, United Mine Workers of America. The miners feel that as the agreement was made retroactive and of force from Apr. 1 the wages paid on Apr. 22 should have been in accord with the new scale, even though the final details of adjustment had not been completed. Neither side seems to think the strike will last, as there are no really important points of difference remaining to be settled. Only the Pittsburgh, Carnegie and Westmoreland coal companies refused to pay the increase when the semi-weekly payday arrived.

On Wednesday, Apr. 26, International President White and District President Van Bittner held a conference at the Continental Hotel with H. K. Fields, the president of the Pittsburgh Coal Co. about the strike at the mines of the latter.

Acme Mines Are Working, but Ellsworth Is Idle

The Acme mines of the Pittsburgh-Westmoreland Coal Co. returned to work, as stated last week; but so far the change of heart at these mines has not produced a similar change at Ellsworth and Cokeburg. At least the miners are not back at work. It will be remembered that the operating company at these mines, the Ellsworth Collieries Co., has locked out the men, but it is probable that the mines would be opened at once if the terms acceptable to the Acme men would be accepted by the Ellsworth miners.

The Ellsworth Collieries Co. is ready to make every concession which the McAlpin contract would require of it, and it takes the stand that the miners are bound by that contract as well as itself, for it has been the time-honored custom to fix the rate for the thin vein and then to base the rate for the thick vein on it. Thus though the thick-vein scale was not mentioned in the contract, both miners and operators in the Fourth Pool are bound by the provisions of the agreement.

Miners Have Fought Each Other for Months

The Crescent mine of the Pittsburgh Coal Co. at California has just ended its two months' strike and also, it is hoped, has stamped out the dissension in the union which has lasted for six months. The trouble which arose over the choice of a checkweighman has laid idle 1,000 to 1,300 men for over eight weeks.

The adjustment of the differences was arranged by Board Member John O'Leary and International Organizer William Feeney. The new "local" is recognized in accord with action taken at the district convention of Mine Workers in Pittsburgh in March, but at the same time an election held by the old local has been recognized as valid.

The union cannot point to the Crescent mine as an instance of the industrial peace which follows organization.

The mine workers employed by the Loyal Hanna Coal Co. have been granted an advance in wages of 3c. per ton for

pick mining and machine work and a 5 per cent. increase for day labor, which are advances equal to those granted in the union mines of the central Pennsylvania field.

The Loyal Hanna Coal Co. has only one mine in the Loyalhanna Valley—namely, that at the town of Loyalhanna, Westmoreland County. The other two mines are at Cairnbrook, Somerset County, and Onnalinda, Cambria County. The Cairnbrook mine is the only mine operated by machines.

Mine Leader Ejected for Stuffing Ballot Box

On Apr. 17 Patrick McCarthy, for many years one of the best-known subdistrict officers and advisers of the United Mine Workers of America in the Barnesboro section, Cambria County, Pennsylvania, was expelled from membership in that organization for a period of 10 years. He was found guilty of stuffing the ballot box at an election held by the members of Barnesboro Local No. 61 when the election of delegates to the state Federation of Labor was in progress.

Strip-Pit Mine Scale in Ohio

Jefferson County in Ohio is the heart of the eastern Ohio coal district. There are some places where the coal can be uncovered by strip-pit methods and others where it can be extracted only by undermining. The miners have been greatly exercised over the cheapness with which coal can be extracted by steam-shovel methods, and some rioting has resulted.

Several weeks ago union officials started to organize the stripping operations at Parlette, Piney Fork and Witch Hazel. Some trouble resulted at that time, which was speedily settled. But the organizers of the union were persistent, and when there was opposition in organizing Parlette and Witch Hazel operations, about 300 union miners met at Piney Fork and, armed with guns and sticks, marched to the operation of the Modern Coal Mining Co., at Parlette.

Some Violence Before Settlement Was Made

A short fight ensued, in which three of the miners were seriously injured. Eight labor leaders were arrested on the charge of rioting, assault and trespassing. However, no damage was done to the machinery at the Parlette mine. A minor riot is said to have occurred at the Witch Hazel stripping.

As a result of the agitation a uniform scale was finally adopted in Steubenville for the mines of subdistrict No. 5 of district No. 6 (Ohio) and was signed by the following operators: J. A. Swanberger, Beech Flats Coal Co.; A. Brenholts, president Modern Coal Mining Co.; J. W. Blower, president Piney Fork Coal Co., and the representative of the Witch Hazel Coal Co. The following miners' representatives also appended their signatures: John Moore, president of district No. 6; C. J. Albasin, president of subdistrict No. 5, and J. B. Blair, chairman of the committee; W. J. Sampson, chairman of the conference and William Roy, secretary.

Men's Wages Will Range From $2.47 to $4

The contract reads as follows:

Contract entered into between subdistrict No. 5 of district No. 6, United Mine Workers of America, and the strip-mine operators of said district beginning Apr. 1, 1916, and ending Mar. 31, 1918. The scale is to be based upon an 8-hr. workday and the following wages are to be paid:

Locomotive engineers, $2.98; trip riders, $2.75; steam-shovel engineers engaged in stripping, $4; steam-shovel engineers engaged in removing coal, $4; steam-shovel cranemen, $3.60; but the engineers of steam shovels which are stripping or removing coal and the cranemen who now receive more than the minimum wage per day shall not have their wages reduced during the life of this contract. Steam-shovel oilers, when such men are employed, $3.15; steam-shovel firemen, $3; coal shovelers who clean spillage around pit cars, $2.75; dirt shovelers, $2.47; roadmen, $2.98; first assistant roadmen, $2.75; machine drillers, $2.80; machine helpers, $2.47; shooters, $2.80; top dumpers and car trimmers (subdistrict agreement), $2.47; ditchers, $2.75; ditchers' helpers, $2.47; groundmen around machine, $2.75; blacksmiths (subdistrict agreement), $3.28; blacksmiths' helpers, pumpers and carpenters, $2.75; waterboys and greasers, $1.64; checkers (subdistrict agreement), $2.64; pipemen (subdistrict agreement), $2.92; well drillers, $3; well drillers' helpers, $2.64; common laborers not already mentioned, $2.47.

Cranemen Relieve Engineers for Inspection

For fractions of hours a full hour's pay shall be granted as has been customary. The locomotive engineer shall take care of his engine and be paid overtime for all work done at the rate of $2.98 per day. Any person accepting employment under the signatory companies shall be governed by the agreement.

It is also understood that at the request of the steam-shovel engineer, and without change of rate, the craneman shall take the engineer's place and the oiler the craneman's place. This is only for the purpose of allowing the engineer time to look over the machinery and shall not apply when the engineer for any reason ceases work for the day. It is understood and agreed that each employee shall perform 8 hr. of labor as directed by the mine foreman. The subdistrict agreement shall govern, when applicable, all conditions of strip mining, except as herein provided.

Ohio To Make Four Contracts

Conferences of the scale committees representing operators and miners in four of the Ohio mining districts were held at various places last week, and generally speaking it appears that agreements may be close at hand, as no really serious differences have arisen except at the conference of the Hocking Valley district held at Logan. Some sharp controversy developed at that meeting, but there is a spirit of compromise noted on both sides.

Hocking Valley Men Oppose Fining Strikers

The Logan conference was conducted with such animation that no adjournment was taken on Saturday, Apr. 22. The anti-strike rule and compulsory arbitration of all differences were discussed at length. The miners are strongly opposed to having them placed among the working conditions, but the operators are insistent. Though no agreement could be reached on these matters, some minor points were satisfactorily settled.

J. H. Pritchard, Ohio deputy mine inspector and safety commissioner, and many operators not on the scale committee were in attendance.

Eastern Ohio Miners Object to Arbitrators

The eastern Ohio district, which is composed of the counties of Belmont, Harrison and Jefferson, met at Canton Apr. 17. This district is the largest producer in the Buckeye State, approximately 16,000 miners being employed. After meeting for one day at the Cortland Hotel an adjournment was taken to Cleveland, where the conferences were resumed. One of the most striking points of difference in this conference is the compulsory arbitration rule. President Albasin of the miners' union is strongly opposed to including it in the new working rules. He claimed that as it now stands the arbitration board is the dumping ground for many petty grievances and it is usually three months before a dispute is settled and during that time the men involved have to remain idle. But the operators contend that the rule has worked out to the advantage of both operators and miners and they are making a strong stand for its retention.

Pomeroy Bend and Ironton Districts Meet

The scale conference in the Pomeroy Bend field started at Pomeroy last week with all the operators in that district on hand. The miners were represented by the officers of the subdistrict as well as by delegates from each local. Contrary to the usual custom, no joint-scale committee was appointed and the conference gave all the delegates a voice. No marked differences developed and many of the minor points were settled. The conference adjourned Apr. 21 to meet Apr. 24 at 2 p.m.

The conference of operators and miners in the Ironton district was held last week at Ironton and the working conditions were adjusted. The new agreement provides for an advance of 3c. on the mining rate, which makes the new schedule 73c. for pick work. An advance of 5 per cent. on all day work was provided. The operators were represented by R. J. Jeffries, of the Hanging Rock Iron Co., F. W. Allard, of the Holly Coal Co.; Morgan Evans, of the Grassefork Coal Co. and F. J. Ginn, of the Ginn Coal Co. The miners were represented by George Cecil, of the Wellston district; H. F. Bartles of the Minersville district, and a delegate from each local.

Final Vote on McAlpin Scale

The McAlpin agreement was submitted not only to the unions directly affected but to all those whose members mine bituminous coal, whether they live north, south, east or west. Thus the miners of British Columbia were allowed to vote on the question whether the western Pennsylvania, Ohio, Illinois and Indiana miners should be compelled to work for the scale just signed.

Although 61 British Columbia union men out of 62, or 98.4 per cent. of those voting, approved of the acceptance of the agreement, only 1.5 per cent. of the number constituting the paid membership as recorded in November, 1915, actually exercised the privilege of voting. In Colorado only 14 men, or 2.7 per cent., voted.

Indiana Voted Heavily with Unexpected Result

The voting was light everywhere except in the Indiana "bituminous" region, where 75.5 per cent. of the men having fully paid memberships in November, 1915, registered their preference. Indiana miners felt strongly about the matter. They proved to be by no means so disgruntled as was anticipated, and they registered the largest percentage of votes for acceptance of any areas directly affected. The talk about Indiana leaving the union is not by any means justified. The

"block" coal district did not vote a large percentage but as far as its preference was recorded was more nearly of one mind than the "bituminous" coal region.

Why It Was Right To Give Whole Union A Vote

At first sight it seems wrong that the miners in the Western field, who are not even in competition, should be allowed a voice in the determining of the wage scale. But it is clear that Iowa, central Pennsylvania, Kentucky and Michigan are really obliged to frame their scales in accord with that of the four-state area. Indirectly that rating fixes the scale over the whole United States and even in Canada.

ANALYSIS OF VOTE ON RATIFICATION OF McALPIN AGREEMENT

District	State	For	Against	Total	Members*	Percentages in Favor	Voting
2	Pennsylvania....	2,453	911	3,364	36,508½	72.9	9.2
5	Pennsylvania....	10,418	5,187	15,605	32,830½	66.8	47.5
6	Ohio.....	12,192	5,143	17,335	30,350	70.3	57.1
8	Indiana.....	162	37	199	767	81.4	25.9
10	Washington.....	534	47	581	3,314½	91 9	17.5
11	Indiana.....	11,010	3,506	14,516	19,213½	75.8	75.5
12	Illinois.....	30,456	18,337	48,793	71,904	62.4	67.8
13	Iowa.....	4,871	4,850	9,721	13,014	50.1	74.7
14	Kansas.....	2,046	1,096	3,142	8,869	65.1	35.4
15	Colorado.....	14	.....	14	520	100.0	2.7
17	West Virginia...	235	149	384	3,568	61.2	10.8
18	British Columbia	61	1	62	4,055½	98.4	1.5
19	Tennessee.....	279	.....	279	463	100.0	60.3
20	Alabama.....	31	.....	31	30	100.0	...
21	Ark.-Okla.....	2,940½	736	3,676½	13,842½	80.0	26.6
22	Wyoming.....	1,595	604	2,199	6,141	72.5	35.8
23	Kentucky.....	1,160½	45	1,205½	4,100	96.3	29.4
24	Michigan.....	577	739	1,316	2,127	43.8	61.8
25	Missouri.....	2,072½	981	3,053½	5,280	67.9	57.8
27	Montana.....	1,260	436	1,696	4,081	74.3	41.5
29	West Virginia...	131	15	146	296	89.7	49.3

* Report prepared for Indianapolis convention showing fully paid membership in November, 1915.

Furthermore, the concessions of the policy committee were in a way violations of the instructions of the Indianapolis convention and had to be legalized and purged by the referendum. It is interesting to note that Michigan, which was not affected directly, was the only state to reject the agreement and that the central Pennsylvania district, which was vitally affected, only polled 9.2 per cent. of the paid membership of November, 1915. It will be noted that Alabama, which had 30 paid and 2 exonerated members in November, 1915, cast 31 votes, all for the agreement.

The unanimity everywhere was striking and justified the prognostications of John P. White, president of the United Mine Workers. Even in the one dissentient state, Michigan, 43.8 per cent. of the votes favored ratification.

Pennsylvania Labor Program

Candidates for the next legislature have received from the Pennsylvania Federation of Labor a list of nine questions bearing on legislative matters in which the Federation is interested. They are given until Apr. 29 to send in their answers to the state labor headquarters in Harrisburg.

No answers are made public, but if they are favorable to the labor federation a letter is given which the candidate can circulate, showing he has the indorsement of the federation. The list of questions complete is as follows:

Would you feel it your duty to oppose the repeal of the full-crew bill? Would you be likely to vote against an attachment-of-wages, or garnishee, bill? Do you favor the idea of holding a state constitutional convention on a nonpartisan basis? Would you be opposed to an increase in the number of the state constabulary and in the salaries of its officers? What would be your probable position on the subject of old-age pensions, to be paid to persons having reached the age of 65 years? Would you be in favor of an adequate appropriation for the mothers' assistance fund, so as to make the fund more advantageous to widows and abandoned mothers, and of making it compulsory on county commissioners to adopt it?

Would you support a bill to prevent the use of machines in the working out of stumps and pillars in the bituminous mines? How do you feel toward the passage of an anti-injunction bill which would provide that what may be done legally by one person shall not be illegal if done by two or more persons?

Would you help to pass a compulsory-compensation act, making it obligatory on all employers to insure their employees in the state workmen's insurance fund; raising the compensation scale to 66⅔ per cent. of wages; paying to widows and dependent widowers the sum of $30 per month as in New York State, till death or remarriage, and increasing the period of payments for disability by at least twenty-five weeks?

The Union in the Anthracite Region Has Been Asking for the check-off, but will not grieve if it is not conceded, for if only the union can establish the closed shop the check-off will be unnecessary, because the man who does not pay his dues will be thrust out of the union and the company will be compelled to give him his walking papers. Why then worry about the check-off with an instrument of such potency in hand?

Extracts from a Superintendent's Diary

The most unpopular man in our camp at the present moment is our commissary manager. His unpopularity hinges on a 20 per cent. increase in the price of explosives. For some time prices on various commodities have been advancing at the commissary, but as the women do most of the buying, the men have not become excited or even unduly impressed by the changes. An advance in the price of ammunition, however, is quite a different matter, and the miners are up in arms almost to a man.

The miners in groups have waited upon our commissary manager to express their displeasure, insisting that the advance is equivalent to a cut in their wages—which it surely is. As he has no interest in the wage scale one way or another and is not familiar with its provisions, and likewise has no control over fluctuations in the price of explosives, their expressed displeasure has not been well received. The miners in turn looked forward to an explanation and, being denied even sympathy, became more disgruntled than ever and did not hesitate to give full expression to their sentiments.

It is not possible for men with interests so widely different to bring an argument to a satisfactory conclusion, and each time as they part it is evident that they hope to renew the conflict as soon as they have had a breathing spell.

There is really but one man in our camp who is in position to appreciate the feelings of our miners—our company physician; his drug bill has more than trebled, owing to the marked advances in the prices of drugs; and as no changes have been made in his per capita allowance, his net income has been painfully reduced. On top of all that, his living expenses have increased and it begins to look to him as if an adjustment from some source should be due. He feels very sure on one point, however, and that is that the miners would not consent to an increased assessment.

Company-owned commissaries contribute much to the success of any mining operation, taken as a whole, but as matters now stand, some of our neighbors who refused to mix merchandising with mining have the laugh on us.

The present state of affairs has put me in hot water—not alone with my miners, but with some of my directors as well. I have always insisted that the commissary was justified only as a convenience to the men and for that reason have held that our prices should not exceed the average of the regular merchant. Some of the directors who have wanted large profits from the commissary now remind me of the fact that, had their advice been followed, we would now be in position to assorb the abnormal rise in the price of powder without disturbing the price to the miner and still break even, while if we should attempt to absorb the advance now without changing the price to the miner, we would lose money. These same directors insist that, according to the price basis that I have adopted, I could not justify the selling of any merchandise below prices maintained by competitive stores. Undoubtedly they have the best of the argument, still I feel sure that unless I am able to obtain their consent to use my own judgment in the matter, life will soon become unbearable, not only for the commissary manager but for myself as well.

Editorials

Break in Anthracite Conference

The break between the operators and miners of the anthracite region was only made necessary by their insistence on a recognition of the union of the most drastic kind. It was not simply recognition they desired.

As their president, John P. White, well says, the operators by their discussion of a contract for several weeks with union officials have shown that they approve of collective bargaining and therefore, it may be added, the public is assured that they will not oppose it. But they do object to an enthronement of the union. They believe men should contribute to it at their own pleasure and not on the demand of any one man or group of men. They are of the opinion also that a man who desires to work in the mines should be allowed to do so whether the union wills it or not.

The miners have not generally been of one mind. Secession is frequently in the air, but the union would Prussianize the industry and compel the discontented under pain of discharge by the operator to both pay their dues and give their allegiance to the organization. The miners who have joined the union under suasion may take note that the body with which they have affiliated is preparing to use their adherence as an argument for forcing them to continue their membership, whether its business is conducted well or ill, whether it attends to their interests or serves only the selfish desires of a few dexterous wire-pullers.

The wage controversy apparently is regarded as of small importance compared with the question whether the union shall be allowed to compel the unwilling to join its ranks and shall be permitted to coerce the undesiring to pay tribute to its funds. It is true as the anthracite operators assert, that they have already conceded a larger increase in wage than have mine owners elsewhere, even though they have granted only a small percentage of what has been asked.

Mr. White's reply to the operators' statement regarding central Pennsylvania is disingenuous. The operators in that district did not grant the closed shop when they allowed what he terms "full and complete recognition of the union," nor did they compel everyone to pay dues.

They did add to the rights of that organization by permitting the check-off to be applied to special assessments and by agreeing to collect from day laborers, but for 15 or more years the check-off has been collected in that district on behalf of the checkweighmen, and for a while at least it applied to all assessments, though every employee had to order then as now that the deduction be made in his particular instance.

The short agreement signed at Altoona, Penn., on Mar. 17, 1900, for district No. 2 states as a final provision:

> When authorized the operators will make such collections through the office as the employees may agree upon.

This clause appears in the contracts of 1901 and 1902, but in 1903 it was changed to read:

> The system of check-off to continue; that is, each operator hereto agrees to collect by percentage of earnings, when legally authorized by such employee, the dues and assessments and furnish the organization a list of those paying.

In 1904 the contract was renewed with only the wage scale changed, but in 1906 the reading was modified thus:

> Any regularly employed miner may, at his option, authorize deductions of coal mined for use of a checkweighman's fund, such amount of coal as he may elect to subscribe, provided such authority is duly executed in writing by each individual miner and such authorization releases the company from all liability on account thereof. There shall be no collection by the companies from day labor working in the mines or outside.

Rules 28 to 31 inclusive in the present central Pennsylvania agreement, it is true, go somewhat further, but they hardly justify Mr. White's contention that a measure of full and complete recognition is granted such as is demanded for anthracite miners. It may be permissible to quote these rules in full:

> Rule 28. Any regularly employed miner may at his option authorize deductions of coal mined for the use of the checkweighmen's fund, such amount of coal as he may elect to subscribe.
>
> Rule 29. Any regular day employee working inside or outside the mine may at his option authorize deductions for the use of the United Mine Workers of America of district No. 2 an amount equal to the regular authorized deductions subscribed by the miner; provided there shall be no collections from mine foremen, assistant mine foremen, firebosses or bosses in charge of any class of labor inside or outside the mine, or coal inspectors and weighbosses.
>
> Rule 30. Special assessments for lawful purposes excepting initiation fees, fines and penalties, duly authorized by the executive board of district No. 2, will be collected from regular employees when subscribed and authorized by employees as hereinafter provided.
>
> Rule 31. It is understood and agreed that the deduction mentioned in Rules 28, 29 and 30 shall only be made by the employer upon authority separately and singly executed in writing by each individual employee, and which authority shall contain a release of the employer from all liability on account of such deductions, and there shall be no so-called button strikes or coercive methods of any character whatsoever used against the employer or employees to compel membership in the United Mine Workers of America, or the making of the subscriptions provided for in Rules 28, 29 and 30.

The reader will note that every tax has to be authorized by the employee and that not only is the operator not required to compel membership in the union, but that the members themselves are forbidden to use coercive methods to increase the membership. Mr. White also says that the miners are granted freedom from car pushing. There is no such provision in the contract, but, as recorded in our last issue, "it was announced that the conference addressed a letter to all operators urging them to give their attention to the car-pushing question, to the end that this problem may not be an issue when the time comes to make a new contract."

There is little back of such an announcement. It does not even request the operators to abolish the car pushing, but it may be regarded simply as an admonition to them to see that their rooms are driven straight, that their room-tracks are well laid and made of suitable material, that their switches are spiked down in a workmanlike manner, that their cars are well oiled and easy running, so that the miners will not be burdened by derailments and stiff cars and will be disposed at the next conference to regard the car-pushing problem with less acerbity.

Moving Pictures or Saloons

Some operators, willing to do anything to build up their towns and coax men from other mines, arrange to erect a saloon on their premises. They have not hitherto been deterred by the increased death and accident rate, nor by the uncertainty of the working force consequent on drunkenness, nor even by the slurs cast on a plant by a workman who cannot make a living at once for himself, his proper dependents, the saloonkeeper and his family, nor by the loss of the better and soberer men who will not stay in a disreputable camp. Perhaps the compensation law will put such an operator in a more receptive frame of mind. Whatever may be said of the "vested rights" of brewers and saloonkeepers, it may be safely declared that they have no right to enter new communities.

When the operator is wondering how he can make a homelike mining town, why does he not pass up the saloon, which breaks homes and put in a moving-picture theater, which supplies the whole family with amusement and creates no debauchees? The place can be made reasonably profitable and the operator will have an opportunity to use it occasionally as a center for instruction in safety, hygiene and social welfare. Who with such an alternative would vote for the saloon?

The Public Will Guess Again

Thirty years ago—not a year more—it was customary to speak with unction about the captains of industry and to expatiate on the chance of every poor young man to get rich. It was a common theme—the opportunity for the ambitious in America. Everyone was urged to become wealthy and influential as quickly as his wits would allow him.

A few rich men abused their opportunities, and a few other men equally rich exploited their failings in the public press, and a change took place in the public point of view. Then followed a period when it was deemed a sign of dishonesty to be rich, and the captains of industry were looked upon as mere pirates on the industrial sea.

It was thought that by raising wages the profits of capitalists might be curtailed. It was supposed that these profits were not necessary to the progress of society, that the railroads, the factories and the steamship lines could and would be constructed on the savings of wage earners. It has been clearly shown, however, that raising wages served, in all cases but that of the railroads, to raise prices to an offsetting level, and in the case of the latter the ever-increasing wage scale left the companies so poor that they could neither build from profits nor borrow money from others.

Consequently we are about to approach a new cycle. One wage earner will not be encouraged to prey on his neighbor wage earner by striking for higher pay. He will not be supported when he urges as his excuse that he hopes to get that increase out of profits, for if true his success in his aims will be a discouragement to industry and if false the statement is a discreditable subterfuge.

There will be no patience after a while with the perpetual stirring up of industrial trouble which only gives the butcher the right to charge the baker more for his meat and only puts the vender of loaves under the necessity of charging the butcher more for his bread. The public soon grows impatient with such folly.

The heroic captain of industry almost in a night became a laughing stock—a big belly and swinish manner were ascribed to him by the cartoonist; and if the unscrupulous labor agitator escapes the same fate in the future he may be thankful for the lack of humor in the press rather than for the essential soundness of his position.

A tribune of the people who, as now in the coal industry, is trying to keep the wages of one group of workingmen in line with that of other industrial workers and with the cost of living has and should have the support of the people. So also should the politician who condemns those who waste profits in luxury and folly and argues that profits are only allowed by the public because they furnish a means by which industry may be extended to the benefit of the commonwealth.

But those people who inveigh against profits, and so tie up expansion, those propagandists who seek to make wages higher than the economic product of the labor performed and who only thereby debase the value of the money paid, will be execrated by the people whom they so grievously have misled.

The new phase in the cycle will come and no one will remember there ever was any other point of view than that which will then be popular. The reasonableness of many of the labor leaders is all that prevents the phase from starting in this present year.

Coal Men for the Industrial Preparedness Committee

As will be recalled, the Naval Consulting Board of the United States was some time ago requested by the President to select groups of five directors in each state for the purpose of inventorying and assembling data concerning the country's resources, with special reference to those required in time of war. In these appointments the coal industry seems to have been almost ignored.

This comes as a distinct surprise, not only for the reason that the industry is one of the three or four leading fundamental trades, but more particularly since its importance has been emphasized in such a spectacular manner in the case of Great Britain. Surely the Naval Consulting Board must be aware of the fact that one of the gravest crises of the war occurred in Great Britain as a result of labor difficulties in the mining regions, which threatened for a time to put the entire British Navy *hors de combat.*

On a careful examination of the personnel of the delegates, we note that in Pennsylvania, the premier coal producer of the country, outputting nearly one-half of our entire production and two-thirds as much coal as either Great Britain or Germany, there is not a single coal man on the board. It is true of course that Pennsylvania is the leading producer of iron products and of oil, the former undoubtedly an essential prerequisite for war munitions, though not more so than the coal with which it is manufactured and moved to its destination.

Surely there are plenty of capable men in the Pennsylvania coal industry to select from. Let us mention just a few whose advice and coöperation would be of great value to the popular cause of preparedness. In the anthracite field there are Warriner, Richards, Williams, Markle, Inglis and Ludlow. In the bituminous end of the industry we have such men as Fields, Clingerman, Robinson, Jones and Keefer.

Sociological Department

Exhibiting Motion Pictures in Mining Towns

By Ernest A. Dench*

SYNOPSIS—To give the right zest to life in a mining town a motion-picture house is necessary. If a building is available the cost of installation is small and the upkeep is not high, especially if the services of a man who is working around the mines can be secured to operate the projection machine. The building should be rendered passably fireproof by covering the interior with plastered lathing.

It is difficult to keep mining employees who work in outlying districts thoroughly contented, for the call of the city is strong. It is possible, however, to curb the desire for the pleasures of the city by entertaining the men with motion pictures, a method that the Homestake Mining Co., of Lead, South Dakota, and several coal-operating concerns have found highly satisfactory.

A miner, at the end of a hard day of physical labor, does not want to work his brains, so he prefers to go to the motion-picture theater and see everything unfolded before his eyes, without any exertion. Practically nothing is left to his imagination, and the occasional brief presentations of explanatory matter appear in such concise and simple form that they sink in without any apparent effort on his part.

The photoplay knows no class or creed and appeals alike to man, woman and child. Naturally, folks have their own particular likes and dislikes, a fact which applies to mining employees and their families; but it is possible out of the one hundred-odd photoplays put out weekly to select a satisfactory program.

While there are bad photoplays, the good ones, which predominate, are the same whether shown at the most pretentious theater in New York or at the smallest hamlet. There is no such thing as a No. 1 company, the only difference being that some of those presented may not be in perfect condition, though they may not have arrived at the "rainy" stage.

No Need To Erect a Special Show Building

The first thing needed for a moving-picture show is an adaptable building, and accordingly the novice in the business is apt to think it necessary to erect a theater expressly for the purpose. But it will be readily recalled that in the early days of the film industry the exhibitor usually did business in a converted store. Since that time the authorities have become far more strict and the public much more fastidious, consequently the modern exhibitor has had to erect a pretentious building in its stead. As a result makeshifts are not now so general.

This development of the auditorium from a store to the semblance of an opera house may lead the operator to believe that he must build an expensive auditorium, and he may well hesitate before spending thousands of dollars, although he knows the investment will better the condition of the employees and enable him to secure more efficient workmen than he would otherwise have.

But the position of an operator in a small mining town is entirely different from that of a proprietor of a picture house in a city, because he is furnishing entertainment of a character that cannot be obtained for miles around. Are the employees, then, going to protest because they do not view photoplays under such perfect conditions as prevail in the towns and cities? If I am not mistaken, they will be more than pleased at the opportunity offered them to pass away a dull evening pleasantly.

Any Large, Lofty and Airy Building Will Do

In selecting an existing building on the plant which can be remodeled into a passable photoplay theater, the following points should be borne in mind: The building should be lofty, well-ventilated and large enough to accommodate all the employees and their families. It should also be free of obstructions in the way of pillars and other supports, and should, moreover, be situated on the ground floor.

The fire danger is ever imminent, and this can only be met by providing plenty of exits. There should be at least four of these, which must open outward. It is advisable to divide the rows of seats into sections so as to provide for an aisle on each side, not less than 3 ft. wide.

If the building happens to be constructed of wood, this does not make it wholly unsuitable; but to make it safe, plastered metal laths or wire mesh should cover the walls and ceilings.

Chairs or benches should be fastened to the floor, because if a fire occurs the seats will be overthrown and will interfere with the orderly egress of the crowd. It is customary in the design of such buildings to allow each spectator 4½ sq.ft. of floor space.

Cost of Erecting and Maintaining a Movie

The projection machine will cost from $250 to $300, according to the make selected. Then a fireproof booth will be needed, which will involve an additional expense of $50. The size of the screen will depend on the room available and the conditions under which the pictures are exhibited. There are many makes of screens on the market, varying in price and quality, but to obtain the best results it will be necessary to pay about $1.50 for the material used for that purpose.

A reliable operator will also be required. To obtain the services of one on full time will cost from $20 to $30 per week, but as he will only be on the job in the evenings, and then perhaps not every night in the week, it might be possible to arrange with some one on the staff having a practical knowledge of electricity who would undertake the work, and who would be paid, of course, for the additional time occupied by the work.

*Brooklyn, N. Y.

The average "feature" at first commands from $50 to $100 per day, but the price eventually drops to $10. But this type of production provides a whole evening's entertainment. As four single reels may be rented for $1.50 and upward, the mine operator is apt to decide in favor of the latter. It will be best to give both forms of entertainment a fair trial in order to determine which gives the most satisfaction.

The reels are rented from the local film exchange. It is customary to contract for a service and pay a week in advance. After this, the weekly requirements can be mailed, telephoned or telegraphed to the branch house. The films are despatched as required, express collect, and when they have been used, no time must be lost in reshipping them, as any delay will cause serious inconvenience to others.

Community Center for Miners

Miss Marcet Haldeman, niece of Jane Addams, has bought seven acres of land near Radley, Kan., and is planning a community center. A playground, tennis courts, a baseball diamond and a running track are to be provided. A community house, to be the home of four organizations which Miss Haldeman formed here last fall, is also planned. Radley is the center of a group of coal mine villages and the establishing of a community center will be a benefit to them all.

Safety Council Bulletins

The National Safety Council is trying out a series of safety bulletins in red and blue colors. They are quite gay and attractive and readily draw readers. The sad message, of course, is in marked contrast to the brilliant coloring. But the mottoes, once read, have the quality

TWO OF THE NEW SAFETY BULLETINS

of sticking in the mind: "Any fool can take chances; it takes brains to be careful." "Better be careful than crippled." "More men killed by accident than by war." "One good leg is worth a whole woodpile of crutches." "How to avoid the stretcher: Don't jump unless you know where you're going to land." "A good lodgeman is a good safety man." "How to avoid the sling: Watch your step; look before you reach; avoid dangerous piles; walk carefully on high places."

It is a far cry from the typewritten notice of the superintendent to these attractive bulletins. There is too often an irritative note in the superintendent's sunfaded instructions. Why it is so is hard to explain. Do what he will he cannot help writing a command, suggesting superiority or making his appeal too weak to effect its purpose. But these bulletins, being impersonal, avoid such pitfalls and are attractive into the bargain.

Mine School as Social Center

In many of the townships of Schuykill County, as in other parts of the coal field, the coal companies pay the greater part of the taxes. To protect themselves and to see that the funds of the county are not wasted, they have formed "taxpayers' associations." A man from the real

SCHOOL AT MARYD, PENN., USED AS SOCIAL CENTER

estate department of that company which pays the largest share of the taxes in any school district will be sent to inspect its accounts and see that the money is being judiciously expended.

When the old-style frame school building at Maryd, Penn., was destroyed by fire last winter a prudent and businesslike school board had sufficient insurance on it to go far in the payment of the estimated price of the handsome building shown here. The locay taxpayers' association, composed of the Maryd, Philadelphia & Reading and Lehigh Coal and Navigation companies, carefully examined the plans and approved of the building, which is a model of its kind.

It serves as a place of worship for the different religious bodies found among the miners, and in the basement a commodious room for the holding of union and secret-society meetings has been provided. Thus it supplies not only an educational but a social center for the village, which is composed of about 170 families. The teachers and school directors and a local priest, who was holding services at the time of the photographer's visit, are shown in the picture.

Hookworm Cannot Propagate in Most Coal Mines—Dr. Hotchkiss, of the Public Health Service, states that mines having a temperature above 72 deg. F., sufficient moisture to make them damp, less than 2 per cent. of salt, 0.1 per cent. of acid or 0.2 per cent. of alkali favor the development of hookworm. Most coal mines, according Dr. W. A. Lynott, of the Bureau of Mines, have a temperature and humidity low enough (about 60 deg. F.) so that the hookworm does not find in them an ideal home for propagation. Dejecta are permitted to remain in the mines, but so few cases of hookworm have been found in the coal-mining districts that the sanitary disposal of human excreta has not been considered necessary.

Discussion by Readers

Success in First-Aid Work

Letter No. 4—I have been much interested in the suggestions contained in recent letters in *Coal Age* pertaining to the success of first-aid meets. I like very much what has been said in reference to the judges selected to pass on the work of competing teams.

The competency and fairness of these judges should be the first consideration in their selection. The success or failure in the accomplishment of the objects desired in first-aid contests, as well as the encouragement to greater effort on the part of the members of contesting teams, depends largely on the judges' decisions as to the relative merits of their performances.

I agree with the suggestion that doctors who understand first-aid work and who are not interested in any of the competing teams would make the best judges. However, as has been stated, it is almost impossible to secure a sufficient number of this class of doctors to act as judges. For this reason it would be advisable to give the charge of first-aid contests into the hands of the Federal Bureau of Mines or the American Red Cross Society, or some other equally neutral organization that could supply competent and disinterested judges of the contest.

I would suggest further that, in case these organizations could not take charge of a contest, it would be well to make a careful selection of a number of well-trained and unbiased first-aid men to act in conjunction with an equal or a larger number of disinterested doctors and constitute a board of judges. In my opinion a board so constituted would not only be competent to form a correct judgment of the work performed, but would be fair and just in its decisions. FIRST-AID MAN.

Burdine, Penn.

Difficulties in Coal Washing

Letter No. 1—Referring to W. L. Smith's inquiry in regard to the best method of cleaning the fines from the "Black Creek" seam and the recommendations of E. Paul Stewart, *Coal Age*, Apr. 8, p. 647, permit me to say that I believe that any method using a screen over which the fine coal is sprayed with clear water will prove wasteful to say the least. It must be remembered also that the installation of a screening plant is an expensive proposition, both in respect to first cost and upkeep.

About two years ago, as chief engineer of the American Coal Washer Co., I made a series of extensive tests with the fine coal from several mines in the Birmingham district. The apparatus used was a "Massco" table, and the results obtained were very encouraging. By the use of that table the loss of fine coal was entirely eliminated. The cleaned fine coal, including all the material that passed through a 60-mesh screen, was sluiced into a settling tank, and if this settling tank is properly proportioned no fines can escape with the waste water.

The "Massco" table not only frees the coal from the fireclay by a simple washing operation, but also separates the fine particles of slate that are closely mingled with the coal. This table is a modified "Wilfley" table, adapted for treating coal. All heavy material settles between the riffles and is carried forward and discharged over the narrow end of the table; but the clean coal, forming the top layer, is washed over and discharged on the long side. At the lower corner of the table, and for a short distance back, a middle product is produced that can be used for boiler-house coal. By the judicious use of diverting spouts, any desired amount of this middle product can be produced.

Ordinarily, three products are made, but there is nothing to prevent the making of as many products as may be desired. For commercial use three products are sufficient, namely: 1. Perfectly clean coal from the first two-thirds of the long side. 2. A middle product containing some good coal, all the bone and some of the lighter slate, from the last third of the long side and the lower fourth of the short end. 3. Clean refuse from the upper three-fourths of the short end.

The "Massco" table has the following advantages over the screening method: 1. No loss of fine coal. 2. The fireclay and all the slate are removed, whereas in the screening method only the fireclay is washed away, without any separation of the slate from the coal taking place. 3. The possibility of making three or more products. 4. Low cost of installation. 5. Low cost of operation and upkeep.

It takes but ½ hp. to operate a "Massco" table, and the capacity of a single table is from 9 to 12 tons per hour. The separation of the slate from the coal is clearly visible, and the operator has always full control over the process. A slight tilting of the table and adjustment of the water supply are all the manipulations required to get the desired results. The practical experience obtained from operating two of these tables at Brookside and the results of several tests made with different coals enable me to conclude that this table is the most efficient and economical apparatus to use in treating fine coal. ERNST PROCHASKA,

Copperhill, Tenn. Tennessee Copper Co.

Drilling and Shooting Coal

Letter No. 3—In response to the request for a discussion on drilling and shooting coal, *Coal Age*, Mar. 4, p. 422, permit me to offer a description of the system in general use in the mines of this state. As the coal here is mined before being shot, it will be understood that the system I am about to describe does not refer to coal shot off the solid.

The system in use is the electric-shooting system, whereby all shots in the mine are fired at one time by a shotfirer on the surface, after all the men are out of the mine.

The lead wires may be independent lines running directly from the surface, or may be taken off the inside power lines for the various districts where the mine is

operated by electricity. The main shooting switch, however, is always located in a locked box outside of the mine, and the district switches inside the mine are likewise placed in locked boxes. The shotfirer is the only man in possession of the keys to these boxes. Where electric mining machines are used each working place is provided with a safety or cut-out switch for the protection of the miners working therein. It is the duty of each miner to open this switch on entering his place in the morning and to close it when leaving the place in the evening, after his shots are ready for shooting.

Essential Points in Blasting Coal

Drilling—All holes are drilled in the clear. The holes average from 5 to 5½ ft. in depth. Where the height of the coal to be blasted exceeds the depth of mining, two rows of holes are drilled. All holes are thoroughly cleaned of drillings or coal dust, and are inspected by the fireboss or shot inspector before they can be charged.

Powder—The powder used is a permissible powder, such as "Monobel" or "Red H Hercules" powder, of varying grades. The miners are allowed enough powder for one day's work and no more. Exploders or electric fuses are furnished to the miners for each shot by the shot inspector when the shots are ready to be charged.

Tamping—All shots are tamped to the mouth of the hole or nearly so with earth tamping, which is taken into the mine for that purpose. Wooden tamping bars are used.

At the end of the shift, the shots being all loaded, the miner couples his detonator wires to the shooting lines, closes his safety switch and goes home. When all the men are out of the mine, the shotfirer first cuts all the power off the mine. He then goes inside and closes all the district switches, and on coming out throws his main shooting switch, making a good contact. Some time after the shots are fired the shotfirer again enters the mine and opens the district switches, locking each box as he does so.

No dust is allowed in any part of the mine and all places are constantly kept in a moist condition. Where electric power is not available, the shooting should be done by shotfirers with batteries, after the men are out of the mine. Although black powder, fuse and squibs are still used in some few of the mines, and the shots are fired by the miners, these are things that, in our campaign for "Safety First," we are endeavoring to eliminate.

Miner.

Salt Lake City, Utah.

Effect of Fall of Barometer on Emission of Gas

Letter No. 3—I am much interested in the discussion running in *Coal Age* in regard to the effect that a sudden fall of barometer may have on the gases given off in a mine. I would like to hear this question discussed further, as there is a great difference of opinion on this subject, and it is not clear in my mind what effect, if any, is produced on the ventilation of a mine by a sudden fall of the barometer.

Referring to Letters Nos. 1 and 2 and the editor's comment attached, appearing on pp. 684 and 685, Apr. 15, I want to say that I agree with the editorial comment and believe that a fall of barometer has no material effect on the emission of occluded gases from the coal formations. It appears to me, as has been stated, that the change in barometric pressure is so slight in comparison with the forces concerned in the emission of gas from the strata that no appreciable effect can be produced by any possible barometric change.

I have never seen any exact data bearing on this subject and beg to submit the following problem: Assume a large gaseous mine that is well ventilated by a fan running at a speed of 239 r.p.m. and producing 165,000 cu.ft. of air per minute under a water gage of 4.2 in., measured in the fan drift. The main air current is divided into six separate splits, thereby providing good ventilation in the several districts of the mine. The coal is 5 ft. thick, and we will assume that there is an abandoned area of 50 acres that has been worked out and is still standing, giving an opportunity for the accumulation of considerable gas. Now, assume that the barometer falls 1 in. in a single shift of 8 hr. The questions I would like to ask are as follows:

A Few Practical Questions

1. How will a sudden fall of barometric pressure affect the speed of the fan, the power applied to the fan shaft remaining constant? 2. Will there be any change in the water-gage reading on the fan drift? 3. What effect will be produced on the volume of air entering the mine? If this volume remains unchanged, will there be any increase in the volume of the return current due to the fall of barometric pressure, the measurement being taken on the main return airway close to the outlet of the mine? 4. Will there be any material change in the ventilating pressure near the working face, and if not, what do we understand is the cause of the expansion of the air and gas in the old workings, causing an outflow therefrom into the main airways? 5. Finally, if the water gage on the fan drift remains constant, will the fall of barometric pressure have any effect in the mine?

Punxsutawney, Penn. Reader.

[Inasmuch as practically all of these questions have been answered at different times in *Coal Age,* we will not reply directly but submit them to our readers for further discussion as may be desired.—Editor.]

Accident in Electric Blasting

Letter No. 10—I read carefully the account given by J. T. Reynolds of an accident in electric blasting while sinking a shaft, *Coal Age,* Jan. 29, p. 221. In a varied experience of 15 years in the use of electric systems of blasting, in both coal and rock slopes and tunnels and in sinking shafts, I have never seen anything occur similar to the accident described by Mr. Reynolds.

It has frequently happened that one and sometimes two or three shots centrally located and connected in series have failed to explode, while the shots on either side of them, in the same series, were exploded when the current was turnd on. I would say that the customary way of firing shots by electricity is to connect them in series, and I have attributed these misfires to damaged connections in the detonators or electric fuses, or to blasting caps that have lost their proper strength, or possibly owing to a poor primer or charge of powder, poor connections in the lead wires, or a poor, weak battery.

But while these different causes may account for a misfire, I cannot understand how they would properly

explain the accident in this instance, since the explosion must have taken place some 10 min. after the wires were disconnected from the battery, it being customary for the men to wait on top that length of time to permit the smoke to clear away from the shaft bottom, even in well-ventilated shafts. It would have been interesting to have known exactly what time elapsed between the firing of the shots and disconnecting the wires from the battery and the later accidental explosion in the shaft. This information would materially assist in determining the possible cause of the accident.

Possible Cause of Accident in a Wet Shaft

The shaft is here described as a wet shaft, which is quite generally the case in sinking. If we assume that electric lights were in use at the bottom of the shaft, which is the usual practice in shaft sinking today, I would ask if it is not possible that the shot, which failed to explode when the battery current was turned on, was exploded later by the current supplying light and power in the shaft. To my mind this may very possibly have been the case. The fuse wires of the unexploded charge would probably be lying in the water accumulated in the shaft bottom during the charging and firing of the holes, and it is not difficult to suppose that the power and lighting current, by reason of the wet condition of the shaft, was transmitted to these wires and caused the later explosion with such fatal results.

While superintending shaft-sinking operations at Lehigh, Mont., where electricity was employed for lighting the shaft, I issued definite orders that the lighting current must be cut off before commencing to charge the holes and the work be performed with the light of miners' lamps. The orders were that this current should not be cut in again until after the shots had been exploded from the surface by a battery. I took this precaution to prevent the possible occurrence of accident through leakage of the electric current employed for lighting. In my opinion, it is very possible for such a leakage to occur in a wet shaft and the current be transmitted to the lead wires of the shots or the wires of the electric fuses used to fire the charge. I offer this as a possible cause of accident and hope it will receive the careful consideration of *Coal Age* readers. It may, of course, have no bearing on the present accident, since we are not informed that electricity was used for lighting or power purposes in this shaft.

J. W. Powell,
Madrid, N. M. Albuquerque & Cerillos Coal Co.

The Efficient Fireboss

Letter No. 1—I have read with much interest the many letters published in *Coal Age* relating to efficient mine foremen and have hoped for some time to see a similar discussion started in regard to efficient firebosses. Permit me therefore to start such a discussion by briefly stating what to my mind constitutes a good and efficient fireboss.

While the fireboss must possess many of the characteristics that have been mentioned in regard to mine foremen, his work is of a different nature from that of the foreman. The responsibilities of his position are at times even greater than those resting on the foreman, since the mining law in some states affirms that he shall have "no superior officer" in respect to the particular duties devolving upon him as fireboss.

It is clear that an efficient fireboss must have a thorough, practical knowledge of all mining methods and be familiar with the requirements of the state mining law. He must have had practical experience in the handling of gas and the use of safety lamps and understand fully their construction and the conditions that would make them unsafe for use. He must be a sober, reliable, conscientious and careful man, who will faithfully perform the duties of his office in every detail. While alert to every danger, he must be fearless in the prosecution of his work.

Responsibilities of the Fireboss

It is true, as has been shown in the letters to which I have referred, that the efficient mine foreman has many responsibilities, but these do not require him to face the same dangers that fall to the lot of the fireboss, who must go into the mine alone in the dead hours of night and take his chances of being overcome with poisonous gas or struck down by falling roof, or burned by walking into an unsuspected body of gas that may be ignited by his lamp. In his inspection of the mine he must often wade through water up to his knees, at the risk of life and health. Notwithstanding these arduous duties, the fireboss is the smallest-paid man in the mine. In many cases he is paid by the day.

I venture the remark that 75 per cent. of miners and many operators do not know or realize the dangers with which the fireboss must contend and the difficulties that surround his position, especially when he is obliged to work under a careless mine foreman or one that has but a theoretical knowledge of gas and its behavior in the mine. Such a foreman will often criticize a fireboss for stopping a few places because of the accumulation of gas or other dangers. Explosions have frequently occurred, in such cases, because the fireboss has permitted himself to be overruled or his judgment set aside by the foreman, who thinks of nothing else than getting out the coal and securing for himself a big reputation. At other times, trouble has been caused by the carelessness, negligence or incompetency of the fireboss himself.

Many Inefficient but Duly Certified Men

Owing to the large number of so-called firebosses who hold certificates and stand ready to take any place that may be vacated, it too often happens that the work of the fireboss is undervalued by the company. In many mines he is given too large a territory and is unable to make a thorough inspection of all the working places within two or three hours before the men go to work in the morning. I would like to ask, How many readers of *Coal Age* consider it safe to go into a place generating gas nine hours after the fireboss has made his examination? In their efforts to cover the large territory given them, many firebosses will run themselves to death, and often the work of inspection is greatly slighted on this account. I know of firebosses who cover 12 miles in from 6 to 9 hours. I hope that the question of efficient firebosses will be given the attention it deserves, to the end that the work of competent and faithful firebosses will be better appreciated by both miners and operators.

Birmingham, Ala. An Old Fireboss.

Paying for the Mining of Coal

Letter No. 3—I cannot refrain from offering a few comments on the statement in the editorial entitled "Philanthropy and Profit," *Coal Age,* Mar. 4, p. 421. This editorial is in fact a continuation of the previous discussion on the payment for coal by ton or by day.

In discussing that question, in the issue preceding the one to which I have referred, Feb. 26, p. 388, I remarked, "Most mine operators . . . can do little or nothing out of pure philanthropy." The writer of the editorial, referring to this remark, says that its author "should be drummed out of camp." Without commenting on the justice of such a criticism, I want to say that the writer of the editorial is passing judgment without having, it would seem, a clear understanding of the relation of philanthropy to business intended to be conveyed in the statement he condemns.

Relation of Philanthropy to Business

Industrial enterprises are not philanthropic movements or conducted for philanthropic purposes. Many business men are undoubtedly philanthropists, but the two propositions are separate and distinct, since the operation of a business involves the idea of material gain, while that of philanthropy sacrifices personal interest to another's welfare. Keeping this distinction clearly in mind, the truth of my statement should be apparent to any broad-minded business man.

If I am not mistaken, the contention in the editorial is that the ton price is a disadvantage and an obstacle to the maximum of gain, both for the workmen and the operator, since the writer concludes with the statement, "The operator is not financially concerned in the fortunes of his employees," and adds: "What injures one is not detrimental to the other. So each goes about his separate purposes." In other words the operator is not interested in securing for the miner a full-capacity day. Whether or not this argument is logical, considered in the light of justice to the miner, can best be shown by the following illustration:

Under present mining conditions the pick miner, the machine loader and the machine runners are the men who are paid by contract on a ton basis. Assuming that the coal is cut by machine and that the miner receives 39c. per ton for loading, while the machine runners are paid 7c. per ton for undercutting the coal, and taking the output, as suggested, at 6 tons per man per day, the loader will receive as a daily wage $6 \times 0.39 = \$2.34$ per day, and the machine runners $6 \times 7 = 42$c., which makes the total cost for undercutting and loading $2.76 per man per day; or $2.76 \div 6 = 46$c. per ton.

Comparison on a Daily-Wage Basis

Let us now suppose that both the miner and the machine runner are each paid the same daily wage of $2.34, which the miner earns for loading on the contract price. A machine cutter and scraper with a longwall or shortwall Sullivan machine can easily cut the coal for 20 men; and it goes without saying that the operator will now be interested to see that every man is supplied with coal sufficient to make a full-capacity day of, say 10 tons per man. Twenty men will then produce $20 \times 10 = 200$ tons per day. The cost for undercutting this coal then will be $2.34 for 100 tons, or 2.34c. per man per ton, or 23.4c. per man per day, which makes the total cost for cutting and loading the coal, $2.574 per man per day. In addition to this, if a bonus of 25c. or 35c. is paid to each miner, as the editorial suggests, the total cost will be $2.924 per man per day, as compared with $2.76, the cost on a tonnage basis.

Now let us ask, What advantage or increase does the miner receive when paid on the day-wage basis? The answer is, By staying in the mine a full shift and loading all his coal, he receives a bonus of 25c. or 35c., from which should be deducted the additional expense he incurs in order to load 10 tons instead of 6 tons per day. Then compare this with the profit to the operator. The 4 tons additional coal costs the operator $35 \div 4 = 8.75$c. per ton, as compared with 46c. per ton, the cost of mining the other 6 tons. At the regular contract price the 10 tons would have cost $4.60, and the operator thus gains the difference between that and the cost previously shown on the day-wage basis of payment, or $4.60 - 2.924 = \$1.676$ per man per day. It is evident that this profit is derived wholly from the miner's increased efforts and does not include the further increase of profits on the sales of the additional tonnage, which is no small item.

An Alternative Proposition

Finally by way of contrast let us assume that the operator would interest himself to provide a full-capacity day for the miner when working at the contract price. The miner would then earn $10 \times 0.39 = \$3.90$ per day for loading, and the total cost for cutting and loading, as previously stated, would be $4.60 per man per day. Under these conditions it is evident that the miner gains an increase of $3.90 - 2.34 = \$1.56$ per day, without any increase in the price per ton. The operator would also gain the profits on the increased tonnage, and these increased earnings would not increase the price of coal to the consumer.

I want to ask, in closing, Which is the more just and equitable method of procedure—that which secures a profit through another's loss or that which secures a profit without loss to either party concerned? I leave this for the readers of *Coal Age* to answer, only claiming that the contract price is capable of producing profit to all parties when there is coöperation and efficiency in the operation of the mine.

The failure of the Pittsburgh-Buffalo Coal Co. has been cited as the result of philanthropic business principles. Might not this have occurred through inefficient management? A large coal corporation in this state went into bankruptcy in July, 1913, for the sum of $23,000,000. The business was placed in the hands of receivers, and without any reduction being made in the price paid to their employees either by the ton or day, in two years this sum was liquidated by $14,000,000; which was the result of efficient management. The Cambria Steel Co., of Johnstown, Penn., decreased the cost of the manufacture of its output by $3,000,000, during 1915, as the result of efficient management and the introduction of improved machinery, and this without any decrease of wages to their employees. These two examples should supply sufficient proof of the value of efficiency in producing profits.

A. M. Iner.

——, Penn.

Inquiries of General Interest

Horsepower and Capacity of Spiral Conveyor

I have recently had occasion, in the design and revision of a coal washer, to make use of a spiral steel conveyor for the purpose of handling crushed bituminous coal. I have been unable to find a formula by which to compute the horsepower that will be required to operate this conveyor. Kindly allow me to submit for solution in *Coal Age* two typical problems, asking that you will give the most concise formula for computing both the horsepower and the capacity of this type of conveyor. The problems are as follows:

1. Assume a sectional steel-flight spiral conveyor of the type shown in the accompanying figure, which is to be found on page 282 of the Jeffrey catalog No. 83. This conveyor is 6 in. in diameter and mounted on a 1½-in.

SINGLE SECTION OF SPIRAL CONVEYOR

pipe. Ninety per cent. of the material conveyed is ⅝ in. and under, while the remaining 10 per cent. will not exceed 1½ in. in size. The flights are ⅛ in. thick. The conveyor is to make 100 r.p.m. and have a capacity of 264 cu.ft. per min. The bearings are spaced at 10-ft. centers. The material conveyed is a medium abrasive material such as coal. Required the horsepower necessary to drive the conveyor.

2. Assume the same type of conveyor as above, but 12 in. in diameter mounted on a 3-in. pipe. In this case 90 per cent. of the material to be conveyed is 1-in. size and under, while the remaining 10 per cent. will not exceed 3 in. in size. The thickness of the flight is $\frac{3}{16}$ in., and the conveyor is to run at a speed of 75 r.p.m. and have a capacity of 1,620 cu.ft. per min., the bearings being spaced 12 ft. apart, center to center. Kindly compute the horsepower for a horizontal haul and state how much this is increased for any given inclination of the conveyor; also, what length of conveyor would mark the practical economic consumption of power. I believe this information will be appreciated by others who must make estimates on similar installations. T. V. SMITH.

La Follette, Tenn.

In spiral conveyor practice the consistency and exact nature of the material handled are such large factors in determining the horsepower required to operate the conveyor that it is practically impossible to give anything more than what might be called a rule-of-thumb method of estimating the power.

No dependence can be placed on an estimate of the power required to operate a conveyor of any considerable length as calculated by a formula, unless previous experience has shown what value must be given to the frictional resistance offered by the particular material which it is desired to handle, as this frictional resistance is the chief factor in the estimation of power, and will be found to vary widely when conveying material of different nature. The weight of the material per cubic foot is only an approximate index of its frictional value.

A spiral conveyor is commonly constructed so that the pitch of the screw is equal to the diameter of the conveyor. The pitch multiplied by the number of revolutions per minute gives the distance the material travels in the conveyor each minute. The capacity of the conveyor, in cubic feet per minute, is estimated on the basis that it runs one-third full. Therefore, the capacity (C) in cubic feet per minute is found by multiplying the sectional area (A) of the screw, in square inches, by its pitch (p) or diameter, in inches, and that product by the number of revolutions (n) the screw makes per minute, and dividing this result by 1,728 to reduce to cubic feet, as expressed by the formula

$$C = \frac{1}{3}\left(\frac{Apn}{1{,}728}\right)$$

Knowing the capacity or the quantity of material desired to be handled per minute, the horsepower (H) may be roughly estimated by assuming that the frictional resistance is equal to the weight, in pounds, of material handled per minute, multiplied by the length (l) of the conveyor, in feet. Or, calling the unit weight of the material w,

$$H = \frac{Cwl}{33{,}000}$$

Applying these formulas to the solution of the two problems given in the inquiry and assuming the crushed bituminous coal mentioned weighs, say 50 lb. per cu.ft., the capacity of the 6-in. conveyor, making 100 r.p.m., is

$$C = \frac{1}{3}\left(\frac{0.7854 \times 6^2 \times 6 \times 100}{1{,}728}\right) = 3.27\ cu.ft.\ per\ min.$$

The horsepower required to drive 6-in. conveyor 100 ft. in length would then be

$$H = \frac{3.27 \times 50 \times 100}{33{,}000} = \text{say } 0.5\ hp.$$

In like manner the capacity of the 12-in. conveyor, running at a speed of 75 r.p.m., would be 19.63 cu.ft. per min. and the power required to drive the same, say 3 hp., for each 100 ft. of conveyor.

These estimates are for a horizontal haul. If the elevator has an inclination, or rise, the latter, expressed in feet, must be multiplied by the weight, in pounds, of material handled per minute, and that result divided by 33,000 to obtain the additional horsepower required for its operation.

Long conveyors of this type are not to be recommended, owing to the grinding action of the conveyor and the great frictional losses. Practically, the length of the conveyor will be limited also by the torsional strength of the shaft when the power is applied to one end only.

Examination Questions

Miscellaneous Questions

(*Answered by Request*)

Ques.—An entry or slope is driven 2,000 ft. on the full dip of a seam of coal that outcrops on a hill slope. The seam has a uniform inclination of 12½ deg., while the ground rises from the outcrop on an angle of 7 deg. It is desired to sink a shaft on the surface so as to strike the head of this entry. What will be the depth of the shaft and what is its distance from the mouth of the slope, measured on the surface?

Ans.—The horizontal distance from the mouth of the slope to the point where the shaft must be sunk on the surface is $2{,}000 \times \cos\ 12° 30' = 2{,}000 \times 0.9763 = 1{,}952.6$ ft. Or, this distance measured on the slope of the ground is $1{,}952.6 \div \cos\ 7° = 1{,}952.6 \div 0.99255 = 1{,}967.2$ ft.

The depth of the shaft is $2{,}000\ (\sin 12° 30' + \cos. 12° 30' \times \tan 7°) = 2{,}000\ (0.21644 + 0.9763 \times 0.12278) = 672.6$ ft.

Ques.—What material should be kept on hand at mines liberating explosive gas?

Ans.—There should be an adequate supply of safety lamps of an improved type, besides first-aid supplies, stretchers, and blankets, together with plenty of brattice cloth and timbers that may be required at any time.

Ques.—What are the advantages of frequently splitting the air current, and what is the effective limit in splitting the air?

Ans.—Briefly stated, the advantages of splitting air currents in mines are the following: A larger quantity of air is then circulated by the same power. The ventilation of the mine is under better control, since the quantity of air in circulation in each district can be proportioned to the special requirements therein. Also, the smoke and gases generated in one section of the mine do not pass into another section, but are conducted at once into the main return airway and pass out of the mine. Fresher air is thus supplied to each portion of the working face, and the velocity of the air current at the face is such as to give no inconvenience to the workmen. Also, a slight explosion occurring in one section of the mine may not be communicated to another section.

The limit to splitting the air in mines is determined by the velocity of the air current at the working face. This velocity must be sufficient to remove the gas generated at the face, while the volume of air in circulation must be sufficient to dilute this gas below the explosive point.

Ques.—A mine has 50,000 cu.ft. of air under a 2-in. water gage, passing in two equal splits, 6x10 ft. in section and 10,000 ft. long. It is proposed to divide this air so that only 15,000 cu.ft. will be allowed to the one split. State how this can be accomplished and the size of the opening required.

Ans.—Assuming that these two splits are equal in size and each 10,000 ft. long, so that the total volume of air passing is equally divided between them, giving to each a circulation of 25,000 cu.ft. per min., and that it is desired to reduce this circulation in one of the splits to 15,000 cu.ft. per min., by means of a regulator, and assuming further that the power on the air in the main airway remains constant, it is first necessary to calculate the power producing the original circulation. Thus,

$$U = 50{,}000 \times 2 \times 5.2 = 520{,}000\ ft.\text{-}lb.\ per\ min.$$

The placing of a regulator in one of the splits will at once increase both the mine resistance and the water gage in the main airway. Then, if the power on the air remains constant, the total quantity of air in circulation will be decreased in the same ratio that the water gage is increased.

This question is worked most simply and quickly by trial. For example, assume the volume of air passing in the open split is increased from 25,000 cu.ft. to, say, 27,000 cu.ft. per min. The pressure will then be increased as the square of this ratio, or as $(27/25)^2$. But for a constant power on the air in the main airway the total quantity of air in circulation will vary inversely as the pressure. Therefore the total quantity of air in circulation, to pass 27,000 cu.ft. in the open split, will be $(25/27)^2\ 50{,}000 = 42{,}800$ cu.ft. per min. This makes the volume of air passing the regulator in the other split, $42{,}800 - 27{,}000 = 15{,}800$ cu.ft. per min., which is larger than the desired quantity.

For a second trial, assume that the volume of air passing in the open split is, say 27,200 cu.ft. per min. Then, since the pressure varies as the square of the quantity of air passing in the open split, the pressure producing this circulation will be increased in the ratio $(27.2/25)^2$. In this case, the power on the air in the main airway remaining constant as before, the quantity of air passing varies inversely as the pressure, which gives for the total quantity of air in circulation, when 27,200 cu.ft. is passing in the open split $(25/27.2)^2\ 50{,}000 = 42{,}200$ cu.ft. per min. The quantity of air passing the regulator is then $42{,}200 - 27{,}200 = 15{,}000$ cu.ft. per min., which is the desired quantity.

The water gage in the main airway, under the assumed conditions, is $(27.2/25)^2 \times 2 = 2.36$ in. But the natural water gage in the regulator split when 15,000 cu.ft. of air is passing is $(15/25)^2 \times 2 = 0.72$ in. Therefore the water gage due to the regulator is $2.36 - 0.72 = 1.64$ in.

The area of the opening in the regulator is therefore

$$A = \frac{0.0004q}{\sqrt{w.g.}} = \frac{0.0004 \times 15{,}000}{\sqrt{1.64}} = 4.68\ sq.ft.$$

[The foregoing question is a difficult one in examination. It was asked at the recent mine inspectors' examination, held at Pottsville, Penn., Monday, Apr. 17, 1916. It is a question that any competent mine inspector should be able to answer correctly. Its solution requires a thorough familiarity with the principles of mine ventilation and the effect of placing a regulator in a mine.—Editor.]

Book Reviews

Elementary Textbook on Mine Ventilation

MINING AND MINE VENTILATION: A Practical Handbook on the Physics and Chemistry of Mining and Mine Ventilation for Vocational Schools and for Those Qualifying for Mine-Foreman and Mine-Inspector Certificates. By Joseph J. Walsh, mine inspector, Wilkes-Barre, Penn. Pp. viii + 176 + 4 index; 5¼x7¾ in.; 26 ill. D. Van Nostrand Co., 25 Park Place, New York, publisher. Cloth boards. Price, $2 net.

Viewed as a book on mine ventilation this volume covers the subject with that measure of completeness demanded by the average mine foreman or inspector. But it is not well to describe it as a treatise on both mining and mine ventilation, for there is nothing whatever in the book relative to mining proper unless it cannot be excluded in discussing ventilation. It would be interesting to know how the book came to have so inclusive a title bringing up to the mind rope haulage, shaft sinking, mining machines and geology. The caption on the back is "Mine Ventilation" simply, and this title is more truly representative of the contents of the book. The subtitle, like that on the back, prepares us for the absence of mining details by denoting the book as "A Practical Handbook on the Physics and Chemistry of Mining and Mine Ventilation."

But the volume does not cover all that might well be said on ventilation. More might well appear about coursing air and about brattices or overcasts. The book hardly discusses the different types of safety lamps or the parts of a lamp, but the mine fan is considered in a brief way. Elementary books have been in the habit of discussing the safety lamp thoroughly as pertinent to mine-gas and ventilation studies, but they usually avoid the mine fan as a matter of a highly technical character, and the information about fans furnished in this book is, it must be confessed, of a somewhat superficial character.

Now and again some statements are found to which exception might be taken. It is stated, for instance, that a decrease in atmospheric pressure which is manifested by a fall of the barometer causes the occluded gas to leave the coal face. This is true, but probably unimportant. The significance of a barometer fall is that it causes the expansion of the gas accumulations in the dead air of mine falls and idle chambers.

If the fall is sudden, it may cause larger bodies of gas to pass into roadways and working places than the fan can be relied upon to remove without danger. The pressure of the gas in the coal runs up from 15 to over 300 lb. It is easy to see that if it is at a pressure of say 100 lb. a change of one ½ lb. representing a fall of 1 in. in barometer would liberate only about 0.5 per cent. of the gas in the face of the coal.

Now it has been shown that extremely unequal pressures can exist in a body of coal. The gas passes through it with great difficulty. That is why the coal is "worked" by the gas. If the coal were porous it would not be decrepitated by the pressure, for the strain on the coal would be relieved by the expiration of the gas through the pores. As a consequence of these reflections it will be seen that it would only be a small film of coal which would liberate its gas and at best only a small portion of the gas in that film would be allowed to escape by a barometric fall of 1 in.

On the other hand if there is a chamber full of air and explosive gas, a fall of ½ lb. in the atmospheric pressure would relieve 3 per cent. of that volume. If the space thus exposed to expansion were 300 ft. long, 30 ft. wide and 10 ft. high, it would pour into the roadways after a fall of the barometer of 1 in., 2,700 cu.ft. of air and explosive gas. This might all come from one room, and its influence on the condition of the mine would be important, especially if many rooms were thus filled with explosive mixtures.

But the author of this book has no reason to feel abashed at this criticism, for he will find the generality of anthracite mine managers prepared to defend his position. They view what has been said as pretty theory, but firmly deny that it squares with their experience.

The book seems well suited for classes studying mine ventilation. There are at the end of every lesson a series of questions which test the degree to which the instructions are understood and furnish matter for helpful debate. As far as can be seen at a rough inspection the statements are reliable; though sometimes they are not as strong as they should be.

Such assertions as that the lamp should not be the final guide as to the presence of carbon monoxide, that carbon dioxide is not as dangerous as carbon monoxide and that 1 per cent. of the latter gas in the air is fatal to life are all true—so true in fact that they create a false impression; for the lamp shall never be used as a guide to the presence of carbon monoxide, carbon dioxide is probably physiologically inactive, and 0.2 per cent. of monoxide is rapidly fatal.

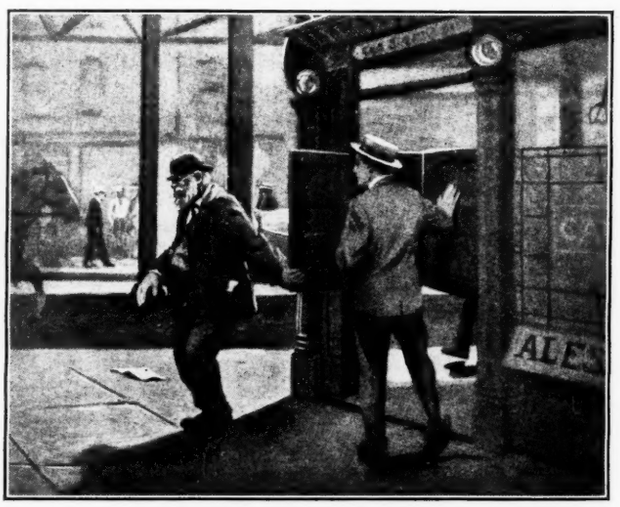
A textbook like this of Inspector Walsh will be widely welcomed, and it is pleasing to see a mine inspector with such an enlightened interest in the needs of education and such a broad knowledge of the basal theories of ventilation. The work can be recommended without qualification to all seeking positions as mine foreman or mine inspector.

Attractive Safety Bulletins

WEEKLY SAFETY BULLETINS—Pp. 46; 8½x11½ in.; 41 ill. National Safety Council, Continental and Commercial Bank Building, Chicago, Ill.

This portfolio of weekly safety bulletins was sent to the reviewer by W. H. Cameron, secretary and treasurer of the National Safety Council, who probably will send a copy of it to anyone who applies, for he is anxious to show what a good work the National Safety Council is doing.

These bulletins are for posting purposes and are regularly supplied to company members, and if any operator is thinking of joining—and there are few who are not considering it—he



A DANGER SIGNAL

cannot do better than send for this portfolio and use it for his own advantage and that of his men.

The bulletins are quite striking. The third is so afflicting that only a doctor could look at it without blinking. The reviewer has been unwilling to read what it says because he has hardly the moral courage to face the illustration. But he has the lesson—a scratch, infection, drainage tubes and the pain, regret, loss of time, doctor's bills and sorrow that go with them. The moral will endure, though the aversion of the reader to the horror of it all permits the lesson to be only fleetingly inculcated. Another picture of an injured eye gives us that creepy feeling which warns better than words.

The illustration from "Life" here reproduced is one of the many best in the portfolio—excuse the solecism—and it tells a lesson plainly which is as old as human nature and yet still needs to be told again and again and again. "Life" tells it here in a manner which does not weary, but in a way which provokes comment—and reform.

Coal and Coke News

Harrisburg, Penn.

The constitutionality of the workmen's compensation act of 1915 was before the Supreme Court during the past week for the first time in an argument on an appeal taken from a ruling of Judge Shafrer in the Common Pleas Court of Allegheny County, which sustained the statute.

It was contended that section 204, which provides that no agreement made before the happening of the accident, except the agreement implied by the act, shall bar a claim for damages, is unconstitutional. It was averred, and not denied, that the plaintiff had neither expressly excepted nor rejected the act. It was further contended that the act was in violation of section 21, of article 3 of the constitution, which provides that no act of Assembly shall limit the amount to be recovered for injuries to person and property.

Counsel for the appellant in attacking the act, said:

The first article of the constitution of this state, known as the bill of rights, declares that all men are possessed of certain inherent and inalienable rights; one of those is the right to acquire, possess and protect property. The preservation of this right requires both that every man should be answerable for his own act and engagements and that no man should be required to answer for the acts and engagements of strangers over whom he has no control. A statute that should impose such a liability, or that should take the property of one person and give it to another, or to the public, without making just compensation therefor, would violate the bill of rights, and would be for that reason, unconstitutional and void.

Section 204 of article 11 of the workmen's compensation act of 1915 is an unlawful interference with the right of an individual to make his own contracts, and, therefore, it is unconstitutional.

The court reserved its decision.

No Complaints Have Been Received

In spite of the many weeks that have elapsed since the State Commission, appointed to supervise the distribution of the anthracite tax collected by the coal companies, not one appeal from any consumer to assist him in getting back the cash said to have been demanded by the dealers has been made to the commission.

Ex-Judge Robert S. Gawthrop, chairman of the commission, has stated that neither he nor either one of the two other commissioners has had a complaint bearing upon the return of this tax.

The chairman of the commission is unable to assign any reason for the failure of coal users to apply for aid. It has been several weeks since the Attorney General assured consumers a way had been found to compel restitution where it could be shown the tax had been passed down to the consumer. The charge commonly made is that the dealers added 25 cents a ton to their coal to offset the tax so long as the law was in effect.

While the absence of agitation has altered the plans of the commision somewhat, so far as the holding of public hearings, as was planned, was concerned, the investigation, will not be dropped by any means. The commission is collecting data from the operators. This information covers the production in the period under dispute, the price before the tax was levied and after, and detailed figures of the amounts collected on the various sizes of coal. After the case of the operators has been disposed of the question will be taken up with the middleman and dealer. In this way, the commission hopes to arrive at the case of the consumer to ascertain how far he had been called upon to share in the tax.

The large coal operators in the meantime are reimbursing the dealers and the consumers who bought at the mines.

PENNSYLVANIA

Anthracite

Duryea—The breaker at the Sibley colliery of the Pennsylvania Coal Co., at Old Forge, has been abandoned and hereafter the coal will be run underground to the Old Forge colliery and hoisted there to be prepared in the Old Forge breaker.

Pittston—Because of the shortage of employees during Holy Week and a slack demand, all of the collieries of the Lehigh Valley Coal Co. were shut down for the week beginning Apr. 17 and resumed operations on Apr. 25. During this week, the Industrial Workers of the World made daily attempts to force a suspension of the Butler colliery, Pennsylvania Coal Co., in Pittston Township. Four of the agitators were arrested, during a demonstration, by members of the Pennsylvania state police and were committed to jail for 30 days each. One man, Tony Policca, aged 43, of Dupont, suffered scalp lacerations from a blow by a trooper's club.

Hazleton—The various anthracite companies in this region are again storing coal, due to the fact that the entire production is not sold and must be taken care of in this manner to prevent closing down entirely.

Pottsville—Joseph Rathway and Stephen Jutney were convicted in court here of having violated mining laws which resulted in the death of a fellow miner. It was shown by the testimony that the men had been given positive instructions by the mining inspector as to the propping of the roof of the gangway, which they neglected to follow. Following a severe reprimand by Judge Bechtel they were fined $25 each.

Jeddo—Many dwellings in this vicinity have been abandoned because pillar robbing in the mines beneath has caused the surface to settle and alter the topography.

Mauch Chunk—A fierce forest fire is burning on Bear Mountain, also in the rear of Mt. Pisgah near Nesquehoning. Every effort is being made to extinguish it.

Wilkes-Barre—The Washington colliery of the Lehigh & Wilkes-Barre Coal Co. was compelled to suspend operation when the company refused to discharge eight men who were not members of the union. Upon their request being refused over four hundred men stopped work.

Beaver Brook—Extensive stripping operations covering approximately a square mile of coal land are now being conducted by the C. M. Dodson Coal Co.

Frackville—The mountains in this section of Schuylkill Valley are being swept by forest fires, which are being fanned by high winds. Several mining towns are threatened. On the summit of Broad Mountain it is worst and the fire companies of the towns and of the coal companies have been fighting the fire for several days.

Bituminous

Charleroi—It is reported that the Alice mine of the Pittsburgh Coal Co. at Roscoe has been sold to the H. C. Frick Coke Co. The Pittsburgh Coal Co. is, however, to work the mine during the balance of this year and ship the output according to the direction of the Frick Co.

Johnstown—The body of Thomas Hoover, checkwayman at the Conemaugh Smokeless Coal Co. mine at Robindale, was recently recovered. Hoover's body was the last of the eight men killed in the explosion in the mine on Mar. 30 to be found. It was discovered in the kickback where the empty cars are stored, and had been submerged in water since the explosion.

Uniontown—The deed transferring the Isabella-Connellsville Coke Co. property from John W. Chalfant, John O. Miller and Arthur E. Braun, to the Hecla Coal and Coke Co. was recently recorded. This property was sold at sheriff's sale, the three buyers composing a committee of the bondholders of the company. The consideration named is $1, but the deed bears revenue stamps amounting to $2,866.50. This would indicate that the property was sold for $2,866,500.

Connellsville—Representatives from the Frick Coke plant between Uniontown and Scotdale recently held a meeting for the purpose of forming an organization similar in general outline to the Frick Welfare Brotherhood. The purpose of this organization is for mutual benefit of the executive force at the various plants, enabling them to get together, get acquainted and exchange ideas. First aid and safety matters in general will be talked over at the meetings as well as efficiency. The organization is not yet complete, but plans are made for its completion.

Clearfield—Ballots will be distributed by the officials of District No. 2, United Mine Workers of America, and the miners will begin the referendum vote on the question of whether to accept or reject the schedule agreed to by the miners' and operators' committees in the joint conference at Philadelphia a short time ago. The balloting will continue

until May 8. It is said that miners have quit their work in many sections of the district because they are not satisfied with the new scale.

Windber—The Berwind-White Coal Mining Co., is planning to hold a big first-aid meet early this summer. The meet will be the biggest thing of the kind ever held in the Windber region.

Pittsburgh—A careful compilation indicates that in this district between $30,000,000 and $40,000,000 are being invested in new by-product coke plants. In addition to new operations by several of the larger coal producing concerns, a number of the steel companies who mine their own coal are erecting plants with the double purpose of utilizing the coke and gas in their own plants, and using the other chemical products for the manufacture of dye stuffs.

Hooversville—Judge William H. Rupple, of Somerset County, has issued orders that the Grand Central Hotel, close its bar—because of a strike that is in progress, in that town. The bar is the only one in the town. Miners of five coal companies are on strike. Operators and miners are expressing belief that the strike at the coal mines in this section will soon be ended. The miners, however, are standing firm on their demand that the operators recognize the union. A local union is said to have already been established.

WEST VIRGINIA

Charleston—The State Department of Mines recently received the report of the coroners jury which investigated the recent explosion in the King mine in McDowell County. The jury reported that every safety appliance required by law had been installed in the mine before the disaster, and that the explosion was caused by a small accumulation of gas becoming ignited from a defective lamp. The force of the explosion was augmented by the ignition of two kegs of powder.

The greatest tonnage of coal hauled from the mines of any one concern over the lines of the Virginian Railway Co. in the month of March originated at the mines of the New River Collieries Co. being 35,037 tons; 514,547 tons were taken from all the mines on the lines of this company.

Beckley—The premature explosion of a shot at the new works of the Leckie Fire Creek Coal Co. on Piney Creek above Sullivan recently resulted in serious injuries to H. F. Leckie, general manager, and L. F. Farley, a workman. Mr. Leckie with several workmen was engaged in driving an entry in a new mine. A charge of dynamite had been placed and the fuse lighted when the premature explosion occurred. Both of the men injured were knocked to the ground unconscious. Both were seriously injured about the face and eyes, and also sustained numerous small cuts from the flying fragments of rock.

Williamson—The greatest tonnage of coal that has been hauled by the Norfolk & Western R.R. during the present year was recorded for the month of March amounting to 2,717,507 tons. Present indications are to the effect that the output will soon exceed the banner month of last year which was that of October when a total of 3,027,236 tons were hauled. The demand for coal for foreign shipment continues to be heavy.

Thomas—The coal companies operating in this section recently organized a district mining institute for the advantage of the employees. The first meeting was scheduled for Apr. 26 with a dinner. Membership dues amount to $1 per year with no other expenses.

The Davis Coal and Coke Co. has established in its main office at Cumberland, Md., a department of safety and welfare among its employees. It will publish an employees' magazine, Charles L. Fay being in charge.

Ramage—The Spruce River Coal Co., J. B. Ramage, general superintendent, has adopted as a motto for the town, "This is Home." Every effort is being put forth both by the company and the employees to give this slogan a real significance.

Borderland—The fire which recently destroyed the tipple, bridge and conveyor of the Borderland Coal Co.'s plant number two, also badly damaged the nearby power plant although it was of brick and fire proof construction. When the bridge collapsed, the stack guy wires which were anchored to it, pulled the boilers off their foundations and completely destroyed the stacks.

ALABAMA

Peterson—The Gilmore mines have resumed operation under the receiver of the company. Two hundred men are employed and 1,000 tons per day are mined.

KENTUCKY

Lexington—Special railroad rates to the Kentucky Mining Institute will be asked of the railroads communicating with Lexington, where the meeting is to be held on May 12 and 13. No effort will be made, however, to run special excursion trains from the western Kentucky fields, in view of the distance.

Figures given out by the Consolidation Coal Co. are to the effect that production from Jan. 1 to Apr. 7 this year was 2,857,000 tons, an increase of 527,000 tons compared with the same period of 1915. This points to an increase over the record production of 1915. The company has contracted for its entire output. The Elkhorn mines of the state in the first quarter of this year showed a 200 per cent. increase over last year.

Louisville—Members of the Workmen's Compensation Board of Kentucky and representatives of numbers of the employers of the state who will be affected, were present on the evening of Apr. 25 at a conference held at the Seelbach Hotel in Louisville. At this meeting the details of the law were gone over and the measure explained to the employers. The law becomes effective on Aug. 1 and applies to all employers of five men or more. It provides rates of compensation but does not undertake to create a state fund, leaving insurance to the commercial and mutual companies.

OHIO

East Liverpool—The strike of 280 miners at the mine of the Dunn-Kirk Coal Co. which ran for several days has been settled by the company permitting the miners to ride to and from work in the mines. The trouble arose over the interpretation of a rule.

Wellston—The powerhouse at No. 12 mine of the Superior Coal Co., near here, was destroyed by fire on April 20, with a loss roughly estimated at about $15,000. The fire had gained much headway when discovered, and hard work on the part of the miners and helpers was required to save the tipple and other property.

Martins Ferry—The suit between the Maher and the Troll coal interests has been settled satisfactorily out of court. The terms of the settlement have not however been made public.

ILLINIOIS

Duquoin—The Illinois Mining Institute will have a regular meeting at Duquoin May 25, 26 and 27.

Nokomis—A petition has been filed for the incorporation of Coalton, a coal-mining town two miles west of Nokomis on the Big Four Railroad.

Springfield—The Springfield Co-Operative Coal Co. has filed suit in the Sangamon County Circuit Court against the Chicago & Alton R.R. for $25,000 damages, alleging that sparks from a locomotive set fire to the top works of its mine Aug. 16, 1915, destroying the tipple, coal chute, engine and boiler rooms.

Belleville—L. E. Wangelin, as special master in chancery, is hearing evidence in the $100,000 foreclosure suit of the Illinois State Trust Co., trustee, against the St. Louis-Coulterville Coal Co. There are two claimants to the property of the coal company. The Belleville Bank and Trust Co.'s claim is based on securities held for money advanced to the coal company. William Winklemann, Edward Ackerman and Peter Gundlach, administrators of the estate of Jacob Gundlach, Jr., base their claim on securities held by Jacob Gundlach to secure a loan.

IOWA

Des Moines—Iowa operators have increased the price of coal to dealers from ten to fifteen cents a ton. Miner's wage increase, increased cost of timbers, powder, feed and transportation are responsible. Mine workers are asking a 5-per cent. increase per ton and will receive it, according to indications. Other mine employees have asked for a corresponding increase and will receive it. It is estimated that the wage increases will add 10 to 12 cents a ton to the cost of mining coal.

KANSAS

Lawrence—Tests of Kansas coal to demonstrate whether it can be successfully converted into coke are to be made by the mining department of the Kansas University, according to a recent announcement by Dean P. F. Walker. It is hoped a washing process can be worked out which will free the coal from sulphur and prove to be a practical process. Coke shipped here costs $10 per ton and an attempt is being made to lower that price with the view of stimulating more industrial activity.

FOREIGN NEWS

Santander, Spain—Owing to a lack of coal the Cantabrico Railway Co. recently announced that it had decided to suspend operation of all traffic for an indefinite period.

Peking, China—It has been announced in Japanese newspapers that Kishichiro Okura, heir to Baron Okura, has decided to engage in coal mining in the Yangste Valley under the firm name of Okura & Co. The mines are 30 mi. southeast of Nanchang in Kiangsi province. The company has already obtained permission from the Chinese Government for the operation.

Buenos Aires, Argentina—Coal for ordinary consumption in the Argentine is now selling for $35 per ton and is hard to purchase even at that figure. To prevent the reduction of the present meager supply the Government has ordered the principle steamship companies not to put on board any outbound vessel more coal than that necessary to carry it to the nearest Brazilian port of call. This coal is the property of the steamship company stored here as a precautionary measure, and the fact that the government has been obliged to place an embargo on this private supply is indicative of the seriousness of the fuel problem in this country The railroad companies have placed an order for 1,500,000 tons of hard wood for fuel.

PERSONALS

T. F. Grogan, of Shawnee, Ohio, has been made assistant superintendent at the Webb coal mine at Wegee. Mr. Grogan has been with the mine inspectors' car for some time.

George McCall has been elected the successor to the late Charles F. Godshall as treasurer of the Westmoreland Coal Co., the Penn Gas Coal Co., and the Manor Gas Coal Co.

Calvin H. Tarleton has been appointed manager of the West Virginia Division of the Consolidation Coal Co., succeeding Harry H. Watson, resigned to take charge of his own mining interests.

James E. Roderick, chief of the department of mines of Pennsylvania spent several days in Western Pennsylvania last week where he has been inquiring into accidents. Conferences were held with inspectors on Apr. 20 and 21.

John Herrity has been appointed assistant inside superintendent of the Philadelphia & Reading Coal and Iron Co. for the Ashland district. Mr. Herrity was formerly inside foreman of Hammond colliery at this place, where he is now succeeded by William Davis.

Samuel E. Daniel, coal inspector for the Illinois Central R.R., escaped luckily when a freight train overtook his railroad motor car on a sharp curve near Central City, Ky. and crushed it. Mr. Daniel was thrown down an embankment but escaped with minor hurts.

John F. Campion, noted Colorado mining man and capitalist, is critically ill at his home at 800 Logan St., Denver. Mr. Campion is suffering from a general breakdown aggravated by his 67 years of age, and indications of hardening of the arteries. His condition is regarded as grave although not necessarily a source of immediate alarm.

Colonel William Leckie, of Welch, W. Va., a prominent coal operator in the southern fields of that state, narrowly escaped fatal injuries recently while making an inspection of some of his properties located in the Pond Creek region. He was riding a horse up a steep mountain side when the saddle girth broke, precipitating him some distance down the mountain and rendering him unconscious. His injuries are however not serious, and the last reports are that he is improving rapidly.

OBITUARY

Seth V. Paine, auditor of the Lorain Coal and Dock Co. died at his late residence, Columbus, Ohio, at the age of 67 years after an illness of two years.

Mrs. Carl Scholz, wife of Carl Scholz, of Chicago, Ill., president of the Rock Island Coal Mining Co., the Coal Valley Mining Co., and of the American Mining Congress, died suddenly recently at the family residence, 700 Bittersweet Place. Mrs. Scholz was Miss Eleanor Hay Barclay, of Lexington, Va. She is survived, besides Mr. Scholz, by a daughter, Miss Margaret Scholz.

Ephriam Barlow, age 79, president of the Burnwell Coal and Coke Co., Sprigg, W. Va., died of pneumonia on Wednesday, Apr, 19, 1916, at his home in Mahoney City, Penn. Mr. Barlow was born in New Philadelphia, Penn. and was associated with the late William M. Quail and Andrew Robertson, also natives of New Philadelphia, in both Pennsylvania and West Virginia mining ventures. With the latter, he was one of the original Pocahontas operators, and was the first operator to ship coal over the Norfolk & Western Ry. through the Elkhorn tunnel. He is survived by his widow and one son, George W. Barlow, Williamson, W. Va.

INDUSTRIAL NEWS

Philadelphia, Penn.—The Marion Steam Shovel Co. recently established a branch office at 1018 Commercial Trust Building, Philadelphia, Penn.

Philadelphia, Penn.—H. H. Lineaweaver & Co., anthracite and bituminous shippers, have announced the appointment of Francis Y. Cory as sales manager.

Ridgway, Penn.—The Ridgway Dynamo and Engine Co. recently moved its Boston office to Room 420, Exchange Building. A. R. Meek is in charge of this office.

Pittsburgh, Penn.—Coal and coke shipments over the Pennsylvania R.R. east of Pittsburgh, during the first quarter of this year amounted to 19,626,029 tons, an increase of 35 per cent.

Buffalo, N. Y.—Lake navigation at this port opened on Apr. 16, several steamers leaving by the south passage, as the wind blew the ice to the north shore. There will still be some delay, as the ice is not out of the upper lakes.

Boston, Mass.—Crowell & Thurlow of this city have just chartered their four-masted schooner "Horatio G. Foss" to carry a cargo of coal from Norfolk to Para at $14 a ton. This is an example of the high water freights now prevailing.

New York, N. Y.—The offices of the Aetna Explosives Co., the Aetna Chemical Co., the Aetna Chemical Co. of Canada and the Aetna Dynamite Co., are now located on the 32d floor of the Equitable Building, at 120 Broadway, New York City.

Wheeling, W. Va.—The Clifford coal mine of the Fort Pitt Coal Co., directly across the river from Moundsville, recently resumed operations after a short suspension. This was caused by the miners digging into an old working in which much gas had accumulated. It became necessary to suspend operations until this gas could be removed.

St. Louis, Mo.—With the object of reaching the Southern coal fields, the Chicago, Milwaukee & St. Paul R.R. is said to be negotiating to take over the Chicago & Eastern Illinois R.R. It is expected that the Evansville & Indianapolis road, which reaches the richest coal fields in Indiana, will also be taken over.

Omar, W. Va.—The Main Island Creek Coal Co. recently placed an order with the Rowe Sanitary Manufacturing Co., of Detroit, Mich., for 75 Ro-San sanitary toilets to be inserted in the homes of the company's employees. A number of these fixtures recently underwent a six months' test by the mining company before this order was placed.

Huntington, W. Va.—A tract of land has been leased from the Virginian Ry. by the Miller Supply Co. and a branch warehouse will be established by that firm at Matoaka, in Mercer County. This branch warehouse will be so located as to readily furnish supplies and equipment to the rapidly developing territory in the Winding Gulf and New River regions.

Washington, D. C.—An Advisory Commission to the United States Bureau of Mines composed of five mining engineers was recently named by the American Institute of Mining Engineers. These men are: L. D. Ricketts, of New York; Hennen Jennings, of Washington; Arthur F. L. Bell, of San Francisco, E. W. Parker, of Wilkes-Barre, and A. R. Leboux, of New York.

Hazleton, Penn.—Coal dealers and all other persons who purchased coal in this district from the Lehigh Valley Coal Co. and Coxe Bros. & Co. have now been notified that the above concerns are ready to refund the state tax of 2½% on all coal sold between July 1, 1913 and May 31, 1915. The refund is to be made by means of credit slips which can be applied to new purchases of coal.

Chicago, Ill.—The Justrite Manufacturing Co. has completed its new factory building at Southport Ave. and

Kingsbury St., which will in future be the home of the company. This building is four stories high and contains 50,000 sq.ft. of floor space. The increase in floor area, and the installation of modern time-saving machinery has been made necessary by increasing business.

Buffalo, N. Y.—Sales Agent Max G. Voelkler of the Youghiogheny & Ohio Coal Co. in Buffalo, President E. J. Skeele of the Skeele Coal Co. and the Canadian Import Company of Montreal have joined in the formation of the Erie & Montreal Navigation Co., with principal office in Buffalo. They have bought the lake steamer "Nipigon" and will use her for carrying bituminous coal from Erie to Montreal.

Fayetteville, W. Va.—W. E. Deegans, of Huntington, and John Faulkner, of Ashland, recently purchased the Avon Coal Co. properties at Accoville. It is said that this will be followed by the general union of the Deegans and Faulkner interests, also the production from the Avon Coal Co. mine will be largely increased, bringing the total annual output under the control of Mr. Deegans to 1,000,000 tons.

Boston, Mass.—In a decision recently in the United States District Court, Judge Morton held the Boston, Cape Cod & New York Canal Co., proprietors of the Cape Cod Canal, liable for damages to the tug "Watuppa" and the barge "Easton," caused by their striking a submerged rock in the canal on Jan. 29, 1915, the tug sinking and the barge going aground. Both boats were owned by the Staples Transportation Co.

New York, N. Y.—The New York coal trade will have a prominent part in the Citizens Preparedness Parade which will take place on May 13. The representatives of the trade on the executive committee are Arthur F. Rice, commissioner of the Coal Merchants' Association, George W. Woodruff, secretary of the Pocahontas Fuel Co., and Charles E. Lester of No. 1 Broadway. The committee has offices at No. 120 Broadway.

Toronto, Ont.—The Crows Nest Pass Coal Co., operating in British Columbia, reports net profits for 1915 at $429,533 or about 7 per cent. on the capital with $245,264 cash on hand. It had a year ago a balance at the credit of profit and loss amounting to over $1,000,000. With the exception of $100,000 transferred to a contingent liability reserve, practically the whole of this has been written off against depletion of mines and old accounts.

Harrisburg, Penn.—A new map of the bituminous coal region of Pennsylvania, showing the present boundaries of the inspection districts, the location of mines and other valuable information, is being prepared by the department of mines. The work has been under way for some time, and a report will be submitted to Chief James E. Roderick in a few weeks. Many surveys have been made and a large amount of data gathered for this purpose.

Washington, D. C.—It has been learned here that serious difficulty has arisen in Denmark on account of the lack of coal owing to English importers advising that they will no longer be able to maintain their shipments because of greatly increased consumption at home. While inquiries are being made as to the probabilities of securing shipments from this country, it is rather doubtful that much can be accomplished on account of the lack of vessels.

Chattanooga, Tenn.—To aid in the development of coal and timber properties in the Dry Fork of the Cumberland plateau the Nashville, Chattanooga and St. Louis Ry. is having a survey made for a possible extension southeastward from Doyle through Spencer and passing Gillentine in Van Buren County and it is stated that if the road is found to be practicable it will be built. Such a line would open up properties of the Dry Fork Coal Co. as well as other important holdings.

Burchfield, Ky.—Fire completely destroyed the power house and machinery of the Pucketts Creek Coal Co. at Burchfield, on the Harlan branch of the Louisville & Nashville R.R., in Bell County, Ky., early Wednesday morning, Apr. 19. The power plant consisted of one 150-hp. return-tubular boiler and one 200-kw. 250-volt d.c. generator. The loss is estimated at $10,000. John Howard, of Middlesboro, Ky., is president and general manager of the company, and Dr. Samuel Bennett, of Middlesboro, the principal owner.

Lexington, Ky.—The Tuttle Coal Co. has been organized here to market the product of several Kentucky mines in Northwestern Territory. The company has $20,000 capital and Louis des Cognets is the principal stockholder, other incorporators including C. E. Tuttle, St. Paul, Minn., and W. R. Tuttle, of Hastings, Neb. Yards will be operated by the company at St. Paul, Minn. The product of the Himya Coal Corporation at Domino, Ky., will be handled chiefly. C. E. Tucker will be vice-president and general manager while Mr. Des Cognets will be president.

Scranton, Penn.—A new process for the manufacture of bricks from ordinary coal ashes has been patented by E. V. Wagner, chief chemist of the Scranton Electric Co. A company has been organized to carry out this business. This company will spend about $80,000 for the erection of a plant which will give employment to between 30 and 40 men and have a capacity of 30,000 bricks per day. It is said that the weight of bricks manufactured by this process is two-thirds that of those made of clay. This will be of considerable advantage for building purposes.

Louisville, Ky.—Kentucky and other shippers on the lines of the Louisville & Nashville railroad have been considerably disturbed by the announcement of the Louisville & Nashville Railroad Co. that it would accept no shipments of any kind for delivery east of the Pittsburgh-Huntington line. The principal object, it is stated, is to hold the equipment of the company on its own lines so far as practicable. The congestion in the East and the fact that more than the due quota of Louisville & Nashville cars are already tied up in that part of the country are also cited.

Pittsburgh, Penn.—W. A. Lowe, president, W. W. Keefer, vice-president, W. R. Calverley, general manager, and E. M. Love, secretary and treasurer, have just completed the organization of the Union Collieries Co. of Pittsburgh. This firm recently placed a contract with the Roberts & Schaefer Co., of Chicago, for a Marcus patent steel coal tipple for the main shaft and a steel head frame for the air shaft. This tipple will be complete with picking facilities and "Rands" loading booms. It will be electrically driven throughout The plant will be built immediately at Unity, Penn.

Des Moines, Iowa—E. A. Sayre of the Eagle Coal Co. has been appointed associate member of the naval consulting board at Washington, D. C. His work on the board will be that of mining engineer. Other Iowans appointed were: George H. Boynton, Muscatine; S. M. Woodward, professor of mathematics at the state university; N. T. Wilcox, Keokuk, and W. F. Cooper, head of the chemistry department, Iowa State College. These men will organize Iowa's industries to make them immediately available for manufacture of munitions and army equipment in case of war.

Huntington, W. Va.—The Price Hill Colliery Co. operation above McDonald, W. Va., has been taken over by Col. Sam Dixon, former head of the New River Co., who will again become actively engaged in the coal business in this section. Col. Dixon and S. McDonald are large stockholders in the Price Hill Colliery Co., and a new lease has been made to a new operating company, of which Col. Dixon is the head. It is understood Col. Dixon will give his personal attention to the operation of the property, which will be put in shape as soon as possible. The lease embraces about 26,000 acres.

Louisville, Ky.—Wireless telegraph service is to be established between Louisville and Harlan Couny by the Harlan Coal Mining Co. and the Lick Branch Coal Co. It is stated that a station will be erected on the roof of the Starks building in Louisville and another in Harlan County at the mines. a distance of 200 mi. No existing wire company has a line into Harlan County and quick communication is now rather a difficult problem. Messages into the Harlan County field, which is increasing in importance, have been telephoned to and from Pineville. This report is said to be well authenticated.

St. Louis, Mo.—The Washington Coal Co., of St. Louis, has been incorporated by W. A. Lafont, E. J. Bergard and Fred Carr, with a capital stock of $10,000, all paid. Mr. Lafont was for 16 years with the Rutledge & Taylor Coal Co. and for 14 years was secretary of that company. A year ago he left Rutledge & Taylor and went to the Southern Coal, Coke and Mining Co. He has patented a coal-loading device for use at retail yards under the name of the Lafont System, which elevates the coal from the cars to bins arranged in a semicircle. The company will exploit this system. Two retail stations are to be established and offices will be opened downtown May 1.

Louisville, Ky.—Fred M. Sackett, largely interested in Kentucky coal mines, and others have been named as members of a committee of the Louisville Board of Trade to consider organization of a State Chamber of Commerce. It is stated that the committee will make arrangements for a conference to be held in Louisville on May 16 looking toward this organization. The purpose, it is stated, is to work out a means by which the various sections of the state can be brought into commercial and otherwise harmonious relations. Under the prevailing manner of development, it is pointed out, various sections of the state have developed without consideration of their relation to the state as a whole.

Market Department

General Review

Uncertainties in anthracite industry stiffen up the market. Prompt bituminous dull but contracts are being negotiated at good prices. Labor difficulties stimulate Pittsburgh district coals. Middle West quiet but steady, particularly on steam coals.

Anthracite—The threatened collapse of the anthracite wage conference, created a rather tense situation in the anthracite trade and precipitated a heavy buying movement the early part of the week. In addition the continued uncertainties regarding what action will be taken on the matter of the spring circular is throwing the business rapidly behind, and causing general dissatisfaction in all quarters. In the meantime prices are very firm, due in part, to the unseasonably cool weather which is shaking out quite a few small orders and to the fact that reserve stocks are low. The beginning of Lake loading and a fairly persistent demand from Western points has also absorbed a considerable tonnage and served to steady the market up. Mine operations have been sharply curtailed, most of the large hard coalers cutting down their working schedules to two to three days per week. This curtailment in operations is causing many men to seek employment in other lines which are more active, so that a return of the heavy demand will find the operators facing a paucity of labor.

Bituminous—The numerous railroad embargoes continue to exert a restraining influence on the trade, cutting off the outlet for considerable tonnage and diverting it into certain restricted channels with a consequent weakening of prices at those points. The high-grade coals are about the only ones in any particular demand, these being generally well covered on contract. Negotiations on new contracts are proceeding with prices firm at a relatively high level. With many of the mines idle, the car supply is fully adequate to requirements at the present time. Evidence of the extremely heavy movement over the first quarter of the year is seen in the tonnage statement of the Pennsylvania R.R. which moved fully a third more coal than during the same period in 1915. In spite of the prevailing dullness, the trade continues optimistic, it being felt that the heavy consumption combined with the scarcity of both cars and miners will soon force the consuming interests to accumulate reserve stocks.

Lake Trade—The unexpected collapse of the New York agreement as interpreted in the Pittsburgh district the early part of the week, threw the trade into a chaotic condition. The labor officials expected to have the matter adjusted by the end of the week, but the shut down was so general throughout the regions that a continuation of it for any longer period would certainly mean a runaway market. In the meantime only a moderate volume of coal is moving into the Lake trade, but with the arrival of the first shipments of ore next week more vessel tonnage will be available and the movement should pick up rapidly from now on. The prompt market is generally weak, though the delays in transportation have had a stiffening effect. Contracts are being concluded at very satisfactory figures to the operating interests and a significant development in this connection is the sweeping rejection of bids on public service contracts because of the high prices quoted.

Middlewest—The market is quiet with the demand centering largely on the steam coals, the new circulars on these grades, advancing the prices above the winter level, being generally well maintained. There has been no increase in the production and the accumulation at the mines seems to have been reduced during the past week. Where the wage agreement has been definitely settled, shippers are actively canvassing for contracts, and consumers are showing less opposition to the increased prices, all contracts so far closed having been made at a substantial advance. The rail movement to Northwestern points is very light. The appearance of Federal agents investigating the price of coal through the Middlewest, has created considerable interest.

A Year Ago—April anthracite business fair but lacking the usual snap that marks the opening period. Bituminous situation mixed. Heavy increase in export business. Adverse outlook in the Lake trade.

Business Opinions

Boston News Bureau—The situation is a most peculiar one. Very little is absolutely known, so there is much guessing and the results show it. There is no definite reason for believing that the crisis with Germany is over. Germany wants to avoid trouble with us, but she is no tready to abolish her submarine warfare. And the question of labor is cutting a figure that almost equals in importance the international problems. Labor is extremely radical in its demands and is giving much distress to capital. The outlook for a coal strike May 1 is ominous. This tends to weaken materially the general prosperity of the country, for it comes at a time when the productive capacity is fully employed, when profits are abnormally large, and yet when price stability is not sure.

Iron Age—The oversold condition of leading steel producers and the tightening of the steel market so far as concerns deliveries this year are more plainly indicated by the developments of the past week. Leaving out rails, new buying has fallen off, but mainly because of the definite efforts of sellers to repress demand, particularly in bars, billets, plates and shapes. Europe is seeking round lots of war steel for this year, and the situation has now gone beyond the point of fencing over the price; few large makers are in position to consider it at all. New capacity is under construction, but its expected output has been sold, perhaps in some cases more than once. The Duluth plant of the Steel Corporation is sold to the end of the year. New capacity in the Central West is also well pre-empted.

Bradstreet—Flood tide aspects characterize demand, with superabundant activity stamping most movements in manufacturing and mercantile lines. While the more serious turn in our international political relations tends to cause concern and some of the lowest prices of the year in stock market circles, effects in other directions thus far have been almost entirely negligible. A few other cross currents are visible here and there, conspicuous in this respect being ease in Southern pig iron, lower prices for coke and deferring of building projects because of extraordinarily high quotations.

Dun—All elements considered, it is remarkable that business continues so large in volume. International complications—intensified by the developments of the week—fail to shake confidence or to check progress, nor have the extremely high costs diminished consumptive buying. The magnitude of demand holding in spite of the general and extensive rise of prices, becomes more noteworthy and transactions, though not yet at the maximum, run far beyond precedent. Commercial failures this week in the United States are 333 against 361 last week, 342 the preceding week and 459 the corresponding week last year.

Marshall Field & Co.—Current wholesale distribution of dry goods is running well ahead of the corresponding period of a year ago. Road sales for immediate delivery continue at the volume of the past few weeks and exceed those of a year ago by a considerable margin. The heavy volume of fall road sales is still being maintained and are much in excess of the corresponding period of a year ago. Customers have been in the market in much larger numbers. Collections are normal. Prices on domestic cottons are firm with an upward tendency.

Dry Goods Economist—All of the lines in which dry goods and department stores are interested continue very firm and sellers strongly emphasize the upward tendency. There are indications, however, that a closer relation between demand and supply is being established. For one thing, a great deal of the spring buying has been accomplished and the lateness of the season from a climatic standpoint has placed retailers in a position where a large proportion of their spring stocks has yet to be disposed of.

American Woolen and Cotton Reporter—Some of the wool from the new clip in the West has just been coming into the Boston market. They are in much lighter condition and better grown than for several seasons due both to climate and feed. Considerable fine, medium, and half-blood Montana wool in the original bags has been selling in Boston at recessions from market prices. The woolen goods market has been somewhat more active during the week under review and it is evident that it will be still more so in the comparatively near future.

ATLANTIC SEABOARD

BOSTON

Pocahontas and New River believed to be on the verge of higher prices. Western demand and shortage of boats the leading feature. Georges Creek in better supply. The Pennsylvania grades hampered by scarcity of labor. Anthracite moves a little more freely.

Bituminous—The market for Pocahontas and New River at Hampton Roads is at the point where a very slight extra demand would harden prices materially. The volume of coal running to the piers is rather less than for several months. The railroads are making every effort to conserve car supply and are keeping in close touch with the movement of boats that are to take the coal. In some cases the agencies are obliged to report names of boats under charter in order to secure car service. A heavy tonnage is still moving west for the line and the Lake trade and with so much labor disturbance in the air buyers accessible by rail are trying to take on coal to the limit of storage. Though not so general in New England the same tendency is observed. The scarcity of marine transportation and the high range of freights continues the leading feature in the coastwise and local trade.

Shippers with contracts effective from Apr. 1 are meeting their obligations only with difficulty. Consumers are insistent and in more than a few instances are making quiet purchases outside in order to be assured of a safe margin of supply.

Meanwhile, prices continue about the same as a week ago. There is, however, more of a determination on the part of most of the shippers not to name prices for any period more than a month or two ahead. Rumors of labor difficulties in the Pittsburgh district and the troubles at Fairmont are regarded as a warning of similar happenings in other directions. The possibility of a disagreement in the anthracite region also has a bearing on the situation. The first three months of the year the West Virginia operators had a very heavy output and the present curtailment of car supply on the Virginia railroads is all the more seriously felt.

Shipments of Georges Creek have very much improved the past ten days. A limited supply is now available at Philadelphia and New York loading ports although it is restricted to contract requisitions. Practically none can be had for the spot market.

The Pennsylvania fields are still beset by uncertainties. Through the shortage of labor practically every mine of any size is little better than 60% normal and sales agents have been obliged to decline orders from regular customers. Plants nearer the region are naturally better cared for than factories in New England and since practically all the former are in iron and steel and have increased consumption the outlook for New England buyers of the more desirable grades is rather poor. The largest tonnage of these coals comes to this market all-rail rather than rail and water and the railroads the past season have proved so undependable that buyers within reach of tide-water are trying to arrange for deliveries from such points. A few market cargoes are coming forward from Philadelphia and meet with ready sale at all the distributing piers.

Anthracite—Domestic sizes are still coming forward slowly, although a better movement has been noticed this week. All the regular shippers have ample business in hand, however, even at the full winter circular and it will be a long time before this market is fully caught up. At the same time a complete settlement of the wage scale and other matters in controversy would give the market a healthier tone. Under present conditions the retailers do not feel like reducing the winter price and with the exception of those consumers who are alarmed over the prospect and are in position to have their bins filled the public generally will buy coal only as they need it.

There is some apprehension over the seamen's strike involving firemen and machinists as well as deck-hands. Already a number of anthracite barges and tugs have been obliged to lie idle until some settlement can be reached.

Bituminous at wholesale, f.o.b. loading ports at points designated, is quoted about as follows, per gross ton:

	Philadelphia	New York	Baltimore	F.o.b. Mine
Clearfields	$2.75@3.20	$3.05@3.50	.....	$1.45@1.90
Cambrias and Somersets	3.00@3.45	3.30@3.75	.....	1.70@2.20
Georges Creek (contract)	3.07@3.17	3.37@3.47	$3.00@3.10	$2.00@2.10

Pocahontas and New River are quoted at $2.80@2.90 f.o.b. Norfolk and Newport News, Va., and $5.25@5.50 on cars Providence or Boston.

NEW YORK

Anthracite buying quiet but market fairly steady. Production slow and steam coals scarce. Lake season under way. Bituminous situation dull but prospects are good. Prices easy. High-grade coals tied up by contract.

Anthracite—There is still an air of uncertainty in the hard-coal market, due in part to the failure of the operators to announce a discount in prices of the prepared sizes as was expected to take effect May 1. Weather conditions have been conducive to a continued consumption, however, and the market is in fairly good condition, though buying is light, consumers purchasing only sufficient to meet necessary requirements.

Production continues on about half-time basis, but with the opening of Lake shipping the prospects are brighter. Companies are looking forward to a brisk demand from the Northwest when the Lake season gets well started. Heavier shipments are being made to Buffalo and many boats are loading.

There is a good demand from Sound and New England points, but locally the demand is quiet, most of the city dealers having sufficient supplies to carry them over. Company coals are being held stiff at the circular, but individual grades are easier. There are reports of some individual coals being sold this week at 10c. less than the usual April prices. Pea and the small sizes are scarce, owing to the low production. Prices for the smaller grades are easy.

Current quotations, per gross ton, f.o.b. tidewater, at the lower ports are as follows:

	Circular	Individual		Circular	Individual
Broken	$5.05	.....	Pea	$3.50	$3.40@3.50
Egg	5.30	$5.30@5.30	Buck	2.75	2.60@2.75
Stove	5.30	5.30@5.30	Rice	2.25	2.05@2.25
Nut	5.55	5.50@5.55	Barley	1.75	1.60@1.75

Quotations at the upper ports are generally 5c. higher on account of the difference in water freight rates.

Bituminous—The soft-coal market is quiet. The signing of the new Clearfield district wage agreement did not have much effect on the Tidewater market. High-grade coal is scarce, most of it being tied up by contract. The prospects of trouble with the mine workers in the Somerset district has caused some uneasiness.

Spot buying has fallen off considerably and prices have declined. The embargo situation is somewhat easier and deliveries are freer. On this account harbor freight rates are about normal. Some shippers look for a much stronger market within the next week or ten days; with cars and labor short, they predict that large consumers will be anxious to lay in stocks.

Demand from New England is heavy and much coal is being sent in that direction. Many of the large contracts have been closed and as a result most of the better grades are practically out of the Tidewater market. For the cheaper coals, quotations range from $2.70 to $3.10 and $3.25.

Current quotations, per gross ton, f.o.b. Tidewater, for various grades follow:

	South Amboy	Port Reading	St. George	Mine Price
Georges Creek Big Vein	$3.50@3.60	$3.50@3.60	$3.50@3.60	$1.95@2.05
Georges Creek Tyson	3.35@3.50	3.35@3.50	3.35@3.50	1.80@1.95
Clearfield: Medium	3.10@3.20	3.10@3.20	.....	1.55@1.65
South Forks	3.25@3.35	.....	.....	1.70@1.80
Nanty Glo	3.10@3.25	.....	.....	1.55@1.70
Somerset County: Medium	3.00@3.10	3.00@3.10	3.00@3.10	1.45@1.55
Quemahoning	.....	3.10@3.30	3.10@3.30	1.55@1.75
West Virginia Fairmont ¾	.....	2.75@2.85	2.75@2.85	1.00@1.10
Fairmont mine run	.....	2.75@2.85	2.75@2.85	1.00@1.10
Western Maryland	.....	2.60@2.75	2.60@2.75	1.10@1.20

PHILADELPHIA

Anthracite marking time. Some price concessions, but market generally firm. Little retail activity. Dealers anxious for settlement. Bituminous trade crippled by embargoes. Few price reductions.

Anthracite—The uncertainty continues and work at the collieries has been most irregular. However, the companies have been able to dispose of their production of about three days a week, without making concessions on the winter circular.

The dealers all agree that any decision is preferable to the present unsettled state of affairs. They are now almost indifferent to an advance in prices but they are extremely anxious for some definite action. A few have been fearing a reduction, estimated at 25c. per ton, which would lessen their profits to that extent. Even the possibility of a suspension of mining for a time is regarded with equanimity as this would at least enable the dealers to dispose of all the coal on hand at a price in proportion to what they paid for it; with the large tonnage in the yards a drop in price any time within the next few weeks would be quite a serious matter to them. For the time being, however, they are resting safe.

Pea coal is the most active of the domestic sizes, all grades bringing the circular price of $2.55. Egg and stove are moving slowly at $3.85 and $4.10 respectively, but are in greater demand than chestnut; with all the best grades of this latter size being held firmly at $4.25, it is not selling in proportion to the other prepared sizes.

With such a stagnant market it is remarkable that there is not more price cutting. Some of the individuals are making confidential sales at from 10c. to 25c. off circular, but these offers are not for any of the popular grades, and as a whole the market is firm. The situation in the West has been a great help, as considerable tonnage has been moving in that direction. The dimunition in price cutting is probably due to the new association of individual operators, as it has been noticed lately that there has been much uniformity in their action; further evidence of coöperation is seen in the fact that most of the individual collieries have closed down for short periods corresponding to that of the larger operators.

Collections show slight improvement, but the balances on the books of the big shippers for February and March coal are larger than they would care to admit, and it is known that in some instances urgent steps have been taken to increase remittances from large buyers. Three small failures were reported this week.

The prices per gross ton, f.o.b. cars at mines for line shipment, and f.o.b. Port Richmond for tide shipment, are as follows:

	Line	Tide		Line	Tide
Broken	$3.60	$4.85	Pea	$2.55	$3.30
Egg	3.85	5.10	Buckwheat	1.55	2.30
Stove	4.10	5.10	Rice	.90	1.80
Chestnut	4.25	5.35	Barley	.55	1.30

Bituminous—With a fair number of orders on their books, the bituminous shippers are almost completely tied up on account of new embargoes narrowing the open territory. At this writing the railroads refuse to allow shipments into Kensington, the great manufacturing district of the city, while the B. & O. has also embargoed shipments to Point Breeze. As a consequence many shippers have been compelled to shut down their mines, but everybody continues hopeful that coal must soon begin to move now that the reserve stocks are beginning to dwindle. Despite these adverse restrictions prices remain fairly firm, only four or five grades showing reductions running from 5c. to 20c. per ton; shippers of the better grades are holding their prices firm. With so many mines idle, there is not much difficulty just now with the car supply.

Georges Creek Big Vein	$1.90@2.00	Fairmont gas, ¾	$1.50@1.60
South Fork Miller Vein	1.75@1.85	Fairmont gas, mine-run	1.35@1.45
Clearfield (ordinary)	1.50@1.60	Fairmont gas, slack	.95@1.00
Somerset (ordinary)	1.35@1.45	Fairmont lump, ordinary	1.10@1.20
West Va. Freeport	1.20@1.30	Fairmont mine-run	.95@1.05
		Fairmont slack	.95@1.00

Bituminous exports from Philadelphia for March amounted to 64,522 and for the first three months of the year were 152,063 tons. Anthracite exports for the same periods were 7,175 and 23,951 tons respectively.

BALTIMORE

Increase in exports the feature of market here. Anthracite conditions await results of conference. Bituminous market flat.

Presenting the best weekly total since before the New Year, the export movement the past week has attracted the attention of the trade here. The total foreign movement cleared was 34,200 tons, nearly three-quarters of the entire loading for March. Eight vessels cleared, also taking 3,289 tons for bunker use.

The bituminous market in this section is flat. Prices on long-term contracts continue firm, and that there is no cutting on better grades of steam coals even for the immediate market, but tonnage movement is light and much coal is reported on sidings at the mines. There is some inclination to sacrifice at times by mines that are caught with considerable coal on hand.

Prices to the trade at the mines averaged about as follows: Georges Creek Tyson, $1.70; Miller vein, $1.50; Quemahoning, $1.60; Somerset, $1.30 to $1.40; Freeport, $1.10 to $1.15; Fairmont gas, three-quarter, 80 to 85c.; same, run-mine, 75 to 80c.; slack, 85 to 90c.

HAMPTON ROADS

Export shipments continue good. Government loads two large colliers. Coastwise shipments also make fair showing.

The dumpings over the Hampton Roads piers have shown up well during the week. The largest quantity to any one country went to Italy. The coastwise movement was practically all to New England ports with a few small cargoes to Baltimore and some of the Southern ports. The accumulation of coal is only slightly in excess of the average holdings. A number of shippers have a surplus which it has been difficult to get rid of on account of delayed vessel tonnage while others are actually short on contract business with vessels close at hand.

There has been little if any change in prices during the week although the demand has been fair. Several inquiries are in the market for large contracts ranging as high as a million tons but so far as can be learned no extra large contracts have been closed. Proposals for supplying the government plants at various points will be opened shortly. These proposals cover coal to be supplied at different stations as well as about 600,000 tons to be delivered into vessels.

Railroad Tonnages—Dumpings over the local piers for the past five weeks compare as follows:

	Week Ending				
Railroad	Mar. 25	Apr. 1	Apr. 8	Apr. 15	Apr. 22
Norfolk & Western	165,608	145,941	144,562	182,621	140,327
Chesapeake & Ohio	90,095	98,495	90,981	85,973	95 838
Virginian	103,055	65,026	74,198	83,228	59,157
Totals	359,758	309,462	309,741	351,822	295,322

Ocean Charters and Freights

VESSEL CLEARANCES

The following steamers have cleared from various ports:

NORFOLK

Vessel	Destination	Tons
Ruth[6]	Buenos Aires	4,701
Berwind[4]	San Juan	2,937
Mavrogordatos	Genoa	5,501
Thorsa[13]	Kingston	1,411
Guilo Cesaro[12]	Porto Ferrajo	5,020
Oceania[12]	Genoa	5,316
Ecclesia[11]	Savona	4,900
Genista[7]	Savona	2,792
Orealla[7]	Savona	2,791
Ulysses[1]	Cristobal	12,000
Lily[13]	Patras	1,910
Fructidor	Taranto	3,239
Angolina[11]	Naples	4,897
Ed Drake	Buenos Aires	1,288
Chiswick[4]	Havana	4,821
A Ciampa[12]	Genoa	1,092
Angola[6]	Lisbon	6,175
Antoinett[4]	Campeche	367
Francis[7]	Para & Manaos	1,314
August[12]	Savona	8,825
Washington[12]	Genoa	6,481
Helvetia[7]	Para	714
Enrichetta[12]	Italian Port	4,797
Clifford	Pernambuco	2,214
Adriatico[12]	Genoa	
Scillin[12]	Genoa	4,556
W. Reitz[13]	Rosario	3,050
Ecaterini[13]	Buenos Aires	5,075
Lombardia[12]	Leghorn	6,028
Burlington[6]	Chile	1,031*
Andrea[12]	Porto Ferrajo	5,593
D. G. Cressy[7]	Para	1,261
C. A. Donnell[12]	Ponta Delgarda	1,551
P. Schultz[5]	Cuba	474

NEWPORT NEWS

Vessel	Destination	Tons
O. Monarch[15]	Montevideo	5,000
Lily[13]	Patras	2,702
Natuna[7]	Buenos Aires	1,404
C. Radcliffe[14]	Genoa	8,753
Ioanna[4]	Buenos Aires	5,910
Asgerd[4]	Buenos Aires	
Wellington[14]		8,287
Itasca[4]	Genoa	1,002
Signe[16]	Vera Cruz	3.000
Wellington[4]		2,050
Foerde[4]	Santiago	3 000

PHILADELPHIA

F. J. Lisman	Havana	
Leonatus	Antilla	
Munorway	Havana	
Josey	Havana	

BALTIMORE

Mar Adriatico	Spain	3,057
Lord Derby	Ecuador	5,728
Claveresk	Cuba	6,050
Tenasserim	Argentina	5,501
Styliani Bebis	Argentina	4,064
Aeon	Greece	3,559
Terschelling	Argentina	3,982
J. S. McCullogh	Cuba	2,259

* And 1,097 tons of coke.

[1] Atwater & Co.
[2] Baker Whiteley
[3] Barber & Co.
[4] Berwind-White
[5] C. G. Blake Co.
[6] Castner, Curran & Bullitt
[7] Chesapeake & Ohio C. & C. Co.
[8] Crozer-Pocahontas Co.
[9] Hasler Brothers
[10] Flat Top Fuel Co.
[11] New River Coal Co.
[12] Pocahontas Fuel Co.
[13] Smokeless Fuel Co.
[14] C. H. Sprague & Son
[15] Maryland C. & C. Co
[16] Houston Coal Co.

OCEAN CHARTERS

Coal freight charters have been reported as follows:

BALTIMORE

Vessel	Destination	Tons	Rate
Tenasserim	Buenos Aires	3,276	$24.60
J. G. McCullough	Guantanamo	1,604	
Isthmian	Rio Janeiro	3,463	
Terschelling	Buenos Aires	1,872	
Eretze Mendi	Barcelona	2,558	
Penobscot	Havana	1,666	31.20
H. Withington	Venezuela	482[3]	

ATLANTIC RANGE

Frankby[2]	W. Coast S. Amer.	2,618	17.04

NEW YORK

Pochasset	New Brunswick	242	$3.75

VIRGINIA

Vessel	Destination	Tons	Rate
V. Black[2]	Para	548	$14.00
Brynhilda	Buenos Aires	1,409	18.75
Maston	Puerto Militar	2,409	22.80
Vanlear	Para		14.00
Trevanian[2]	Plate	2,727	20.40
Berwick Law	Plate	2,939	20.40

PHILADELPHIA

Bluefields	Jucaro	324	$7.00
Ulrick Holm	Havana	930	
F. Hyde	St. Croix	383	
R. B. Cobb	Manzanillo	530	

[1] April-May. [2] May. [3] Coke.

OCEAN FREIGHTS

During the past week two large steamers were chartered to load coal at a United States port for the lower Plate port, May or June loading, at $20.40, and we have a May boat asking the same rate. A steamer was reported as having been chartered from a United States port to Genoa at $30.58, and we have a steamer for May loading that will undoubtedly accept this figure, possibly less. We also have numerous boats pro-

posed for coal to Spain and Portugal at about $30, which rate can no doubt be shaded. Steamers are also offered at $17 for coal to good ports in Chile and Peru. A smaller steamer was chartered with coal to Guantanamo at $7.50.

We would quote freight rates on coal by steamer as follows:

To	Rate	To	Rate
Havana	$4.50@5.00	Bermuda	$5.00@6.00
Cardenas or Sagua	6.25 about	Vera Cruz	7.00 about
Cienfuegos	5.50@6.00	Tampico	7.00 about
Port au Spain, Trinidad	7.25 about	Rio Janeiro	[4]19.00 about
St. Lucia	7.25 about	Santos*	[1]19.50@20.00
St. Thomas	6.50@7.00	Montevideo	20.40 about
Barbados	7.25 about	BuenosAires orLaPlata	20.40
Kingston	6.25 about	Rosario	20.40@21.60
Curacao	6.75@7.00[3]	West Coast of Italy	31.20
Santiago	6.00@6.50	Barcelona**	30.00 about
Guantanamo	6.00@6.50	Valparaiso or Callao	17.00 about
Demerara		Marseilles	30.00 about

* Consignees paying dockage dues. ** Spanish dues for account of cargo.

[1] 500 tons discharge. [2] 400 tons discharge. [3] And p.c. [4] Net, 1,000 tons discharge. [5] Or other good Spanish port.

W. W. Battie & Co.'s Coal Trade Freight Report.

Note—Charters for Italy, France and Spain read: "Lay days to commence on steamer's arrival at or off port of discharge; 24c. per net register ton per day demurrage."

COASTWISE FREIGHTS

Rates to Boston from Hampton Roads are $2.35@2.50, with very little tonnage offering. There is still transportation for quite a volume of coal to be arranged for in New England and consumers and shipper are getting anxious. For each order the market has to be scoured for boats and when a bottom is to be had it is usually a re-charter by some merchant who has concluded not to use the boat himself.

From Norfolk to points like Providence the demand is still fairly strong. Rates are 90c.@$1 with no surplus of barges.

LAKE MARKETS

PITTSBURGH

McAlpin agreement not followed and majority of Pittsburgh district mines are idle this week. Coal market may advance sharply. Small movement of Lake coal.

While wage matters were supposed to be fairly well adjusted in the Pittsburgh district the incorrectness of this assumption was suddenly brought home to operators at the beginning of this week, when less than half the miners reported for work. It is stated that not a single mine of the leading interest was in operation at the beginning of the week, while many of the independent mines were idle. The operators assert that they have the national officials of the miners' union on their side and that the national officials are endeavoring to bring the local organization into line to accept the terms offered by the Pittsburgh district operators on the ground that they are in accord with the McAlpin settlement. There is ground for some doubt whether the accord is complete. If it is, the prediction may be borne out that the difficulties will be adjusted by the end of the week, with full operation assured for next week, but it may well be doubted whether a settlement will prove so easy.

Meanwhile there is no definite market price for coal developed. Even a few days of curtailed production would necessarily make prompt coal scarce and send prices soaring. We repeat last week's quotations on prompt coal, noting that they are becoming nominal: Slack, $1.05@1.15; mine-run, $1.20@1.30; ¾-in., $1.30@1.40; 1¼-in., $1.40@1.50, per net ton at mine, Pittsburgh district.

There was a moderate volume of coal shipped Lakeward last week, enough to mark definitely the opening of the movement, but shipments are likely to be light this week. Next week vessels should begin arriving in some numbers with their initial cargoes of ore, and some will take coal back, though many vessels are committed to a policy of making their return trips light this season, in order to bring down as much ore as possible.

BUFFALO

Coal still moving at a slow rate. Anthracite finding next to no market. Independents trying to get full circular prices. Railroads making better deliveries.

Bituminous—The market is quiet. Shippers are finding that as a rule there is more coal mined than is needed, but they are making a good list of contracts. Some report they have a great part of their output satisfactorily sold up for the entire year. Contract prices are more profitable than has been the rule for some years, in spite of the increased costs. The public contracts are mostly in bad shape. Bids have been thrown out wholesale, some because of irregularities, and others because of the high prices. The bidders complain that specifications are much more complicated and exacting and that high prices are necessary. There is a better movement of cars, though if cars become really plentiful the market will suffer and possibly break down.

Prices are still fairly strong and the consumption is keeping up. Pittsburgh is holding as firm as ever and confidence in the future of the market is greater there than it is here. The following is the scale of prices:

	Pittsburgh	Allegheny Valley	Penn Smokeless
Lump	$2.95	$2.75	$2.80
Three-quarter	2.85	2.60	.....
Mine run	2.75	2.50	2.60
Slack	2.40	2.30	2.60

Prices are per net ton, except east of Rochester and Kingston, Ont., where they are per gross ton.

Anthracite—The demand continues light. In fact there is so little sale for most sizes that some of the larger companies are running their mines only about half time. The opening of the Lakes will take care of quite an amount, though it does not appear that the upper Lake docks are in great need of coal. Lake vessels began to leave here on Apr. 16 and all of the fleet went out during the week past that were ready. The coal cleared amounted to 241,621 net tons, of which 126,400 tons cleared for Chicago, 84,321 tons for Duluth-Superior, 21,000 tons for Milwaukee, 6,500 tons for Menominee and 3,300 tons for Fort William. There were 33 cargoes.

The following is the continued winter price at wholesale for anthracite, per gross ton, f.o.b. cars, Buffalo:

Grate	$5.60	Chestnut	$6.10
Egg	5.85	Pea	4.30
Stove	5.85	Buckwheat	3.25

An additional charge of 25c. a gross ton is made for putting coal on vessels.

COLUMBUS

The trade quiet. Attention of operators and shippers centers on wage scale conferences. Steam coal the only active department.

With practically all Ohio mines idle and no immediate prospects for resumption, the trade has been very quiet during the past week. Little domestic buying is reported and what tonnage is moving is for steam purposes. Prospects are bright, however, and operators as well as shippers are preparing for a busy season when mining is resumed.

By far the most important feature at this time is the steam business. Contracts are being renewed to a certain extent and prices are generally higher than last year. Quite a few of the operators prefer to wait until wage scale matters are finally adjusted before making contracts. Railroad fuel contracts are also attracting attention and several have been closed. It is conceded on all sides that both railroads and steam users will have to pay more for their tonnage than in former years.

Retail trade is slow as the stocking season is still far in the future. Some Pocahontas is being sold at the April circular.

Lake trade is showing signs of activity. Quite a few bottoms have been loaded and some have started from the lower Lake ports.

	Hocking	Pomeroy	East Ohio		Hocking	Pomeroy	East Ohio
Re-screened lump	$1.50	$1.60	.....	Mine-run	$1.15	$1.20	$1.15
Inch and a quarter	1.40	1.40	$1.40	Nut, pea and slack	.90	.90	.85
Three-quarter-inch	1.35	1.35	1.30	Coarse slack	.80	.80	.75
Nut	1.25	1.25	.....				

CINCINNATI

Increasing Lake business, labor and car shortages stiffen up the market. Prices steady, with a rising tendency.

The movement to the Lake ports, is now reaching a good volume and is expected to increase rapidly when the ore vessels begin to make their regular trips. Buying on contract has improved, consumers seemingly having come to the conclusion that it will not pay to wait until the latter part of the summer to contract, or to take chances on getting spot coal at bargain prices. With railroad traffic congested and a marked scarcity both of cars and men, the impression is growing that there will be an advance in prices.

DETROIT

Improved demand for steam coal. Domestic grades and anthracite are easy. Lake movement opens actively. Scarcity of Lake vessels.

Bituminous—A more general tendency to buy is noted in the steam coal trade. Though suggesting a broader market, the buying movement is chiefly apparent in an increased number of orders for small tonnage and centers largely on small sizes though with some demand for three-quarter lump also. For the latter the ruling price is about $1.25 and slack sells at from 90c. to $1 at the mines. Very little demand is noted for domestic coal.

Anthracite—Wholesalers are maintaining prices on anthracite at the winter schedule and not much business is being done. Shipments are delayed by congestion in the Eastern freight yards.

Lake Movement—Opening of Lake navigation was hastened by employing icebreakers to open channels into some of the harbors and through St. Marys River. A considerable number of freighters carried coal cargoes on their first upbound trips, the aggregate being large despite the slow movement of coal to the loading docks. Shippers are still seeking vessels and are offering an advance in rates for delivery to Lake Michigan ports. Ships of medium size are especially difficult to obtain owing to the fact that many of the freighters that can pass the Welland Canal, have been sold for use on the Atlantic coast.

COKE

CONNELLSVILLE

Coke still softer. Many suspensions. Contract market dead. Production exceeds shipments.

The coke market has softened further in the past week. In addition to several suspensions by various furnace interests the Lackawanna Steel Co. has now suspended shipments on all contracts, and surplus coke is still more in evidence. It appears that most of the suspensions have been due not to the furnaces consuming less coke than formerly, but to operators overshipping on their contracts, resulting in surpluses at furnaces which could be corrected only by a suspension.

While the market is soft it has a bottom, bids at slightly below $2.25 not bringing out any standard-grade coke to speak of, and the market is quotable at $2.25 against $2.25@2.50 quoted the past two weeks.

Celebration of the Easter holidays made labor short at the beginning of the week and the week's production may be reduced, though hardly enough to advance the market when there is a considerable surplus to start with. The slump in prompt furnace coke in the past three weeks has entirely killed interest in the contract market. The prospective buyers feel they should be quoted lower prices than formerly on contract coke for the second half, while the operators are so fearful of serious labor shortages later that they are unwilling to reduce quotations.

Foundry coke is in somewhat reduced demand, and particularly in the Pittsburgh district, where the foundries are operating at a lower rate than at any time since the strike of molders began on Dec. 13 last. We quote: Prompt furnace, $2.25; contract, $2.50@3; prompt foundry, $3.75; contract, $3.50, per net ton at ovens.

The "Courier" reports production in the Connellsville and lower Connellsville region in the week ended Apr. 15 at 462,920 tons, a decrease of 2,744 tons, and shipments at 454,395 tons, a decrease of 11,080 tons.

Buffalo, N. Y.—The trade is quiet and the demand does not pick up quite as promptly as was predicted by the manufacturers at the ovens. It appears that the supply ran up too high, on account of there being more profit in coke than in coal and it may be hard to get prices back again, especially as it was generally agreed that quotations were high. Quotations remain on the basis of $5.50 for best 72-hr. Connellsville foundry and $4.25 for 48-hr. furnace.

Chicago—Domestic coke trade is fair. Foundry and industrial coke is in brisk demand. Contracting in byproduct sizes is still very active. Prices are firmly held at the following quotations per net ton, f.o.b. cars Chicago: Connellsville, $6.50; Wise County, $6.25 to $6.50; byproduct foundry, $6.25 to $6.50; byproduct domestic, $4.50; gas house, $4.50 to $4.60.

MIDDLE WESTERN

GENERAL REVIEW

Spot prices temporarily soft. Strong contracting movement. Screenings in brisk demand at high prices. Eastern coals easy.

Conditions are quiet as is usual at this time of the year. Strength is shown in steam coals, particularly screenings, despite the lethargy in other directions. Open market quotations for immediate shipment of screenings are at high levels. Illinois fine coal is selling as high as $1.10 per ton. The new steam coal circulars, which are higher than winter prices, are generally maintained. All signs point to a well sustained market for the steam sizes, and it is doubtful if buyers will be able to manipulate prices as in times past.

Contracting is brisk, and all business so far executed has been at full circular prices. Some of the public service corporations, who are large consumers of steam coals, have not yet covered their requirements, but it is not expected they will remain open very long. Consumers show a disposition to contract at liberal prices, and every contract so far made shows an appreciable increase over prices prevailing a year ago.

It is reported that the movement of West Virginia and Kentucky coals to Lake points has been retarded by reason of railroad embargoes due to congestion at terminal points, scarcity of labor, and lack of cars. The Indiana labor situation is practically settled, and shippers in that state are showing much activity in soliciting contracts at prices showing substantial advances.

CHICAGO

Strong demand for screenings. Domestic sizes lifeless and smokeless coals demoralized. Anthracite demand flat.

There has been slightly increased operating time at some of the Franklin County mines. A sharp demand exists for all steam sizes, and some domestic orders have arrived. Williamson County production is reduced 90%, and the operators do not expect a revival of business for at least 30 days. Screenings are strong at from $1 to $1.10; steam lump is in good demand and washed coals are selling readily at the new circular.

The Springfield district shows little activity except in screenings, for which there is a stiff demand at close to the $1 mark. There is no call for coarse sizes.

Steam coals are moving steadily from the Indiana mines, and prices are holding firm at 10c. per ton higher than a month ago. Clinton screenings are bringing around $1.05 per ton and Knox County from 95c. to $1. The industrial demand in the Calumet region for steam sizes will undoubtedly be stronger than ever before, and the outlook for Indiana shippers is most promising. It is said that April tonnage will show an increase over last year.

Smokeless mine-run is weak and has been sold as low as $1.15 this week; lump shipments have been sacrificed freely at prices ranging as low as $1.25. Some of the retailers have been taking advantage of these low prices to stock up on smokeless sizes. Hocking shipments to this territory are infrequent, and but little splint is being marketed.

Considerable lump coal has been shipped from Eastern Kentucky mines to Northern dealers at $1.25. The output is holding up well considering the fact that these mines are heavy domestic producers.

Quotations in the Chicago market are as follows, per net ton f.o.b. mines:

	Williamson and Franklin Co.	Springfield	Sullivan	Clinton	Knox and Greene Cos.
Lump	$1.35@1.45	$1.35@1.50	$1.50@1.65	$1.40@1.50	$1.40@1.50
Steam lump	1.30	1.30@1.35	....	1.30@1.35	1.20@1.25
2½ and 3-in. lump	....	....	1.40@1.50	1.35@1.40	1.35
1¼-in. lump	....	....	1.25@1.35	....	....
Egg	1.35@1.45	1.20@1.25	1.35@1.40	1.40@1.50	1.35@1.50
Nut	....	1.20@1.25	1.20@1.25	1.35@1.50	1.20@1.35
No. 1 washed	1.40@1.50	....	....	....	....
No. 2 washed	1.35@1.40	....	....	....	....
No. 1 nut	1.35@1.45	....	....	....	....
No. 2 nut	1.30@1.35	....	....	....	....
Mine-run	1.20@1.25	1.10@1.15	1.10@1.15	1.10@1.15	1.05@1.10
Screenings	.95@1.10	.85@1.00	.95@1.05	.95@1.00	.95@1.00

	Harrisburg & Saline Co.	E. Kentucky	Pocah. & W.Va.Smok'l.	Penna. Smokeless	Hocking
Lump	$1.35@1.45	$1.25@1.90	$1.25@1.60	$1.25@1.60	$1.65@1.75
1¼-in. lump	1.25@1.30	....	....	....	1.40@1.50
Egg	1.35@1.45	1.25@1.60	1.25@1.60	1.25@1.60	1.60@1.70
Nut	1.35@1.45	1.15@1.50	1.25@1.45	1.25@1.45	....
No. 1 nut	1.35@1.45	....	....	....	....
No. 2 nut	1.40	....	....	....	....
Mine-run	1.25	1.15@1.25	1.15@1.25	1.05@1.25	1.15@1.20
Screenings	.90@.95	.90@.95	....	....	....

FOREIGN MARKETS

GREAT BRITAIN

Apr. 12—Business is almost at a standstill, there being practically no coal to offer. Under these circumstances, prices are purely nominal, but up to $11.04 has been paid for small lots of large to complete. Quotations are approximately as follows:

Best Welsh steam	Nominal	Best Monmouthshires	$10.80@11.64
Best seconds	Nominal	Seconds	10.80
Seconds	$10.80@11.64	Best Cardiff smalls	5.88@ 6.12
Best dry coals	10.20@10.80	Cargo smalls	3.84@ 4.80

Freights—Chartering is very slow owing to shortage of coal and loading turns. Rates are irregular and are approximately as follows:

Gibraltar	$13.68	Naples	$20.40	St. Vincent	$11.40
Marseilles	23.16	Alexandria	27.00	River Plate	15.60
Algiers	17.76	Port Said	26.40		
Genoa	20.40	Las Palmas	10.80		

Financial Department

Consolidation Coal Co.

President J. H. Wheelwright reports for the year ended Dec. 31, 1915, as follows:

New Mines—Your company has opened in its Jenner field, Somerset County, Penn., two new mines on a line which the Western Maryland R.R. has built into this field, and on Helen's Run, in the Fairmont, W. Va., field, your company has sunk four shafts over 500 ft. deep, and the Western Maryland R.R. has constructed a line up this run to these shafts, which railroad will be in operation prior to June 1, 1916. Your company having been ready to begin shipments of coal last November, will commence shipments as soon as the railroad is completed. Up Bingamon Creek, in the Fairmont, W. Va., region, your company is opening three mines, and prior to the completion of the road that the Western Maryland R.R. is building, will have mines in operation and ready to ship coal as soon as the railroad is completed.

RESULTS FOR YEAR ENDING DEC. 31 (INCLUDING SUBSIDIARIES)

	1915	1914	1913	1912
Coal mined	10,466,414	9,562,515	9,959,811	9,238,482
Coke manufactured	89,197	58,202	76,050	62,647
Coal mined by lessees	428,106	479,971	480,242	536,401
Gross earnings, all sources	$15,617,968	$14,828,981	$15,443,246	$14,520,417
Operating expenses, taxes, etc.	$11,175,117	$11,022,090	$11,281,655	$10,430,735
Depreciation	438,053	414,245	334,888	342,792
Total	$11,613,170	$11,436,335	$11,616,543	$10,773,527
Net earnings	$4,004,798	$3,392,646	$3,826,703	$3,746,898
Bond interest	$1,208,020	$1,113,576	$1,085,894	$974,080
Sink. fund cons. coal bonds	261,097	167,633	174,120	162,953
Sink. fund sub. cos. bonds		101,704	106,960	106,492
Cash dividends (6%)	1,500,000	1,500,000	1,500,000	1,358,865
Total deductions	$2,969,117	$2,882,913	$2,866,974	$2,602,398
Balance, surplus	$1,035,681	$509,733	$959,729	$1,144,492

COMBINED GENERAL BALANCE SHEET DECEMBER 31

Assets	1915	1914	Liabilities	1915	1914
Property acct.a	$53,315,601	$52,117,956	Capital stock.c	$39,190,500	$31,190,500
			[$25,000,000 outstanding Dec. 1915.]		
Adv. payments on coal land purch.	2,012,545	1,797,075	Bonded deb.	23,224,000	23,112,000
			7% conv. debs.	7,000,000	
			Convertible 6s.	6,500,000	6,500,000
Due from 1st and ref. mtge. trustee	b159,140	89,685	Car trust bonds —assumed by C. & P. R.R.	228,000	304,000
Stock reserved for conversion of bonds, etc.	c14,190,500	6,190,500	Purchase money obligations.	6,215	2,615
			Bills payable		2,200,000
Stocks allied cos.	d3,906,888	d3,906,888	Accounts payable	553,560	582,633
Other investments	331,007	306,007	Pay-rolls	185,863	183,029
Sinking funds	899,855	821,614	Royalties payable	12,115	77,346
Bonds in treasury	1,067,000	708,000	Int. coup. and divs. not presented for payment	70,201	50,331
Coal and coke	1,253,531	526,224			
Materials, supplies, etc.	1,017,20	1,081,638			
Bills receivable	127,482	319,055	Bond int. accrued	392,036	395,246
Acc'ts receivable	6,086,521	5,636,397	Sink. fds. accrued	139,849	128,235
Cash in banks, etc.	4,224,186	1,155,228	Div. pay. Jan. 31	375,000	375,000
Cash for bond int. and divs. due	70,201	50,331	Individuals and cos.	634,802	468,578
Special deposits to cover royalties	11,094	76,243	Profit and loss.e	10,160,617	9,213,328
Total	$88,672,756	$74,782,841	Total	$88,672,756	$74,782,841

a Property account ($53,315,601) includes: Coal lands and other real estate, $35,639,648; less reserve for exhaustion, $3,433,174; balance, $32,206,474; mining plants and equipment, $20,679,243; less reserve for depreciation, $3,858,000; balance, $16,821,243; Cumberland & Penn. R.R., $3,336,612; less sinking fund for redemption of bonds, $860,709; balance, $2,475,903; Cumberland & Penn. R.R. equipment, $1,864,322; less reserve for depreciation, $724,973; balance, $1,139,348; floating equipment, $1,129,932; less reserve for deprec., $457,300; bal., $672,632.

b For 75% of cost of improvements, extensions, etc., $141,841, and for expenditures on Northern Coal lands, $17,298; total, $159,140.

c Includes $6,190,500 stock reserved for conversion of 6% secured bonds and $8,000,000 stock reserved for payment of principal and interest at maturity of the two-year 7% debenture bonds due Feb. 1, 1917, and for other corporate purposes.

d Stocks of other companies owned include 18,900 shares of common stock and 5,400 shares Northwestern Fuel Co. pref. stock and 7,513 shares Metropolitan Coal Co. common stock. Of the above, 5,000 shares of M. C. Co. stock and 18,000 of the N. W. F. Co. common stock, together with $6,500,000 1st and ref. M. bonds, are held by Equitable Trust Co. of New York, trustee, as collateral for convertible 6s.

e After deducting $88,392 adjustments for previous years.

The above new mines in Pennsylvania and in West Virginia are additional development of lands that have been owned by your company for a number of years, thus bringing these into development, and at the same time giving your company the benefit of an entirely new transportation company, which, together with the new equipment the Western Maryland R.R. is buying to take care of this development, should largely augment the past tonnage from these fields.

Bonds, Etc.—The aggregate outstanding bonded debt of the company is $34,657,000, exclusive of $1,067,000 5% first and refunding mortgage bonds held in treasury and $1,000,000 of bonds of the Cumberland & Pennsylvania R.R. Co., issued under its mortgage of Apr. 1, 1891. The securities in the sinking fund of this mortgage, with the annual accretions, will provide ample funds for retirement of the bonds at their maturity. Included in the above outstanding bonded debt are the $6,500,000 10-year 6% convertible secured gold bonds of 1913, due Feb. 1, 1923, and the $7,000,000 2-year 7% [convertible] debenture bonds dated Feb. 1, 1915. Of the authorized issue of $40,000,000 first and refunding mortgage bonds, dated Dec. 1, 1910, there have been issued: $11,403,000 which are included in the above amount of outstanding bonds and $9,754,000 are reserved to provide for the retirement of an equal amount of other bond issues of the company and its subsidiary companies, and which are included in the above amount of outstanding bonds.

Coal Mined by the Company and Its Subsidiaries, by Divisions

	Maryland	W. Va.	Penna.	Mill Cr.	Elkhorn	Total Gross	Net Tons
1915	2,020,841	4,648,285	1,717,399	537,522	1,542,367	10,466,414	11,722,383
1914	1,992,342	4,160,041	1,777,355	495,950	1,136,827	9,562,515	10,710,017
1913	2,127,131	4,656,640	1,743,536	459,202	973,302	9,959,811	11,154,989
1912	2,162,996	4,576,484	1,748,091	522,900	228,011	9,238,482	10,347,100

The coal mined by lessees in the Maryland, West Virginia and Pennsylvania divisions aggregated 479,479 net tons, against 537,568 in 1914.

Note—For previous annual report of the company see Vol. 8, p. 788.

United Coal Corporation

In connection with an issue of $700,000 first-mortgage 6% serial gold bonds, this company makes the following statement:

Purpose of Issue—The proceeds will (a) retire the unpaid balance, $299,500, of the first-mortgage bonds, issued under its mortgage dated 1910; (b) will retire the issue of $250,000 two-year notes, dated Aug. 1, 1915, and (c) will provide working capital and additional funds for expansion of its business. The two issues above mentioned are being called for payment as of July 1, 1916, and Aug. 1, 1916, respectively, so this issue will be secured by an absolute first mortgage. Of the unissued balance of first-mortgage bonds $50,000 may be issued to provide additional working capital, the remainder to reimburse the company for 66⅔% of the actual cost of permanent additions.

Property—Consists of nearly 4,900 acres of coal land in Franklin County, Illinois, of which over 4,000 acres are not yet worked. The company operates two fully equipped mines, one of which, with a daily capacity of 2,500 tons, has been in operation since 1906. The second, completed in 1912, has a capacity of 4,000 tons. Based on engineers' reports during the past few years, the actual physical value of our property is in excess of $1,700,000.

Earnings—For the three years ending Apr. 1, 1916, the net earnings from operation of property, including our selling organization, C. M. Moderwell & Co., have averaged over four times the interest charges on the present issue, after deducting depreciation on plant and equipment.

Sinking Fund—Four and one-half cents per ton on coal mined must be paid to the trustee monthly. This sinking fund is irrevocably pledged to the payment of these bonds at maturity. In case the amount for any one year is greater than the amount of bonds due, the surplus must be used in retiring additional bonds. On the basis of 4½c. per ton, the present issue will be paid off before half the present property is exhausted.

Organization and Management—The company is still in the hands of the original owners. The output is sold exclusively by C. M. Moderwell & Co., the entire capital stock of which company is owned by the corporation. The company's product is sold over a territory including Texas, Louisiana, Arkansas, Missouri, Kansas, Nebraska, North and South Dakota, Minnesota, Iowa, Wisconsin and Illinois. The Chicago, Burlington & Quincy and the Illinois Central railroads serve the properties.